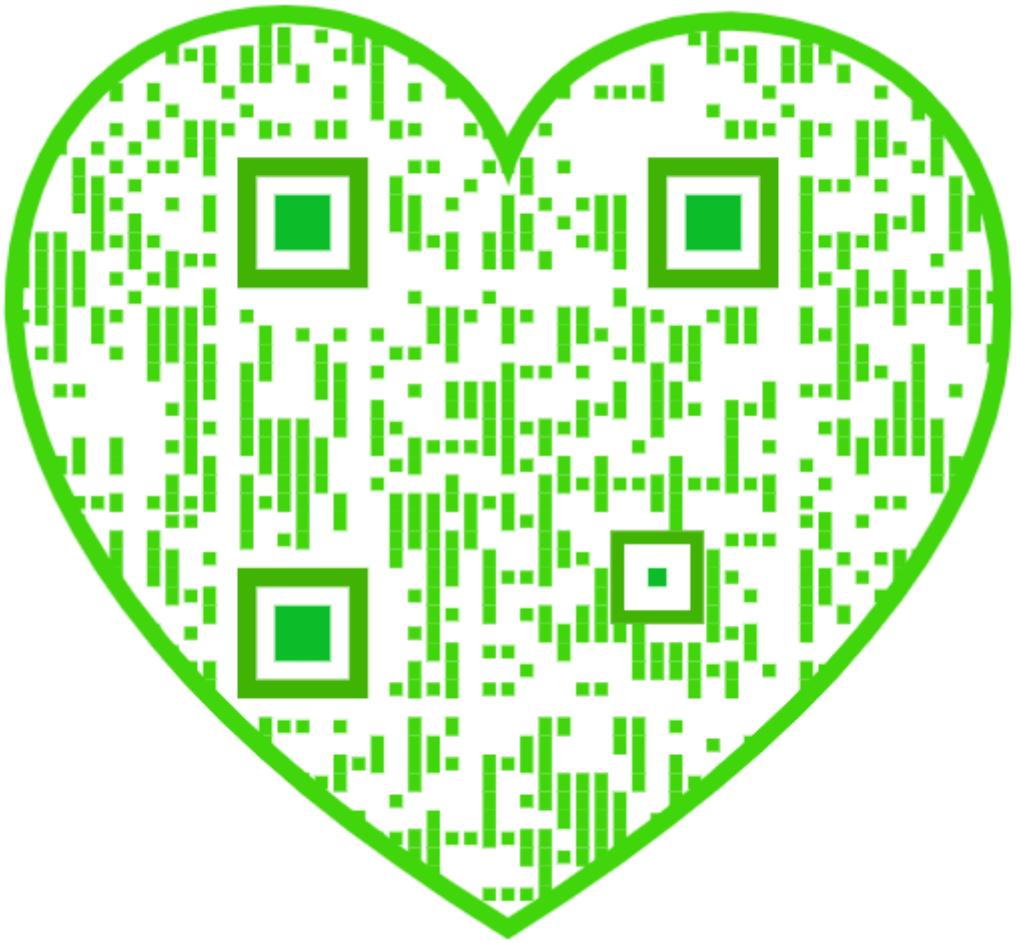

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PRACTICE OF EQUINE MEDICINE

A MANUAL FOR

STUDENTS AND PRACTITIONERS OF VETERINARY MEDICINE

ARRANGED WITH

QUESTIONS AND ANSWERS

WITH AN APPENDIX CONTAINING

PRESCRIPTIONS FOR THE HORSE AND THE DOG

BY

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To

HIS ESTEEMED FRIENDS AND TEACHERS

THE ACKNOWLEDGED FATHERS OF THE VETERINARY PROFESSION

IN AMERICA

JAMES L. ROBERTSON, M.D., D.V.S.

PROFESSOR OF THEORY AND PRACTICE AND CLINICAL VETERINARY MEDICINE

AND

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IN THE

AMERICAN VETERINARY COLLEGE

BOROUGH OF MANHATTAN
NEW YORK CITY

FOR THEIR UNTIRING WORK

THIS IS SINCERELY DEDICATED BY

THE AUTHOR

PREFACE TO SECOND EDITION

It has been both gratifying and encouraging to the writer to have his efforts received so kindly, and he takes this opportunity to thank the members of the profession (including the students) by whose cooperation a second edition is demanded.

In the second edition it is not my purpose to enlarge to any extent, as it would thus interfere with the primary object of the work, viz., to give the student and busy practitioner a condensed work on the Practice of Equine Medicine.

Knowing the importance and benefit of prefixes and suffixes to the students in aiding them to formulate and understand more readily the definitions of words used in medicine, the author has added to the list, and also included a few derivations from the Latin and Greek roots.

The principal other additions will pertain to bacteriology, which has to do with the Etiology of certain Infectious Diseases so far as Pathologists have been able to aid us. Other alterations and additions will be made wherever deemed necessary.

H. D. HANSON.

New York City, July, 1908.

PREFACE TO FIRST EDITION

Feeling that the students and practitioners of Veterinary Medicine have long been in need of a condensed work on Theory and Practice of Equine Pathology, the author has put forth his energy in their behalf.

He hopes that his efforts will not be misunderstood, as a small work like this cannot and is not intended to be as complete as larger ones. If this will be a help to *students* in getting their degrees and in passing the State Boards, and to the busy *practitioner* for quick reference, then his efforts have not been misplaced.

The author has used as concise and as plain language as possible, often at the expense of grammatical precision.

Some of the prescriptions in the Appendix are those I have used in practice, while others are among some selected from divers places, but whose authorship is unknown to me.

The following are the writers freely referred to: Professors Jas. L. Robertson, A. F. Liautard, W. Williams, F. Dunn, Wm. Robertson, Friedberger and Fröhner, Jas. Law, A. Smith, Wm. Osler, Wm. H. Thomson, Loomis, Pepper, Flint, and others. I am indebted to Professor Roscoe R. Bell for his valuable assistance in correcting proof, and to my brother, F. R. Hanson, D.V.S., who has kindly assisted me in preparing the Index.

In conclusion, I would ask and highly appreciate any suggestions which the readers may feel disposed to make for the improvement of the work.

THE AUTHOR.

New York City, January, 1899.

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PRACTICE OF EQUINE MEDICINE.

SECTION I.

INTRODUCTION.

What is meant by the practice of equine medicine?

This we understand to be the exercise of medical art, and includes all the knowledge which has been acquired of the causes, pathology, symptoms, and cure of the diseases of the horse tribe.

1. PATHOLOGY.

What is pathology?

It relates to the study of disease; being derived from *pathos*, signifying "a disease," and *logos*, meaning "a discourse;" thus, a discourse of disease or a doctrine of disease.

What is zoo-pathology?

The term zoö-pathology is more properly applied to veterinary medicine, and signifies the doctrine of diseases of animals.

How is pathology divided?

Pathology is divided into *general pathology* and *special pathology*.

Define each.

General pathology is the study of groups of diseased processes.

Special pathology is the diseased processes occurring in one affection; or, it has to do with particular and individual diseases exhibited in particular animals.

What does general pathology include?

It includes *nosology, ætiology, morbid anatomy, semiology, diagnosis, prognosis, treatment.*

NOSOLOGY—NOMENCLATURE.

What is understood by the terms nosology and nomenclature?

Nosology is the division and classification of diseases; *nomenclature* signifies the naming of the diseases. These are both divisions of general pathology. It is desired, in naming of the diseases, that such names chosen shall express the condition present as well as the location; this, however, is often difficult.

The following prefixes, suffixes, and roots are some of the most common, and may aid in defining and locating various affections:

Latin Prefixes.

ante-, before, as in antemortem, antepartum.
bi-, two or twice, as in biped, bicuspid.
circum-, around, as in circumscribed.
con- (co-, cog-, col-, com-, cor-), together or with, as contraction, conception, concussion.
contra- (counter-), against, as counterirritation.
ex- (e-, ec-, ef-), out, as expectant, excision.
inter-, between, as intermittent, intercellular.
intra-, intro-, within or into, as intracranial, introduction.
non-, not, as nonpoisonous, nonnitrogenized.
per-, by or through, as perspire, percolate.
post-, after, as postmortem, postpartum.
pre-, before, as predispose, prescription, precussory.
re-, back, again or anew, as react, respiratory.
retro-, backward or behind, as retropulsion, retropharyngeal.
sub-, under, after, up, as subnormal, subcutaneous.
super-, over, above, too great, as superpurgation, superrenal.
trans-, beyond or through, as transudation, transfusion.

Greek Prefixes.

a-, an-, am-, without, not, the absence of a thing, as anorexia (loss of appetite), apnœa (without breath), apterous (without wings), anæmic (without blood).
amphi-, around, on both sides, as amphibious (living on land and in water), amphiarthrosis (articulating both ways).
ana-, up, throughout, again, as anasarca (water—throughout the flesh).

anti-, against, opposite, as antidote (a medicine to act against), antispasmodic (a medicine against spasm).

cata-, down, through, as cataplasm (something laid down, a poultice), cathartic (to carry down, a purgative).

dia-, through, as diathrodial (motion through a joint), diarrhœa (flowing through).

dys-, ill, difficult, painful, as dystokia (difficult birth), dyspnœa (difficult breathing), dysphagia (painful swallowing).

ec-, out of, from, as eczema (a boiling out, eruptive skin disease), ecbolic (medicine that throws out, causes abortion).

en-, **em-**, in, within, as enema (an injection), endermic (in the skin).

endo-, **ento-**, within, as endocardium (within the heart, lining membrane).

epi-, upon, on, over, as epiglottis (over the glottis), epilepsy (a seizing upon).

hemi-, half, as hemiplegia (paralysis of half the body).

hyper-, above, too great, as hyperæsthesia (increased feeling), hypertrophy.

hypo-, below, under, as hypodermic (under the skin), hypostatic, hypoglossal.

meta-, with, together with, change in form and place, as metastasis (change in position), metamorphosis (change in form).

para-, beside, near, abnormal, through, as parasite (one who lives on the food of another), paracentesis (a piercing through).

peri-, around or about, as periosteum (membrane around bone), peritoneum, pericardium.

pneumo-, air in an unnatural part, as pneumothorax.

poly-, many, as polyuria (excessive secretion of urine), polydipsia (excessive thirst).

pro-, before, forward, as prognosis (knowing beforehand the termination of disease).

pyo-, pus, as pyothorax, pyuria.

syn- (sy-, syl-, sym-), with, together, as synechia (holding together, adhesion of iris to cornea), system, systole.

Latin Suffixes.

-able (-ible, -ble, -ile), that may be, as soluble.

-ac (-al, -an, -ar, etc.), like, being or relating to, as cardiac, ocular.

-an (-ant, -ent, etc.), one who or that which, as physician, expectorant, stimulant.

-ance (-ence, -ancy, -ency, -age, etc.), state, quality, condition, or act, as emergency.
-ary (-ory, -ery), place where, as aviary.
-ate (-ite, -ive), one who or that which is, as purgative, sedative.
-ate, -ose (-ous), **-ulent, -aceous,** abounding in or having quality of, as saponaceous, carbonate.
-cle, (-cule, -ule), minute, as molecule.
-escent, becoming, as evanescent.
-ferous, -fic, causing or producing, as soporific.

Greek Suffixes.

-æmia or **-hæmia,** blood, as anæmia, pyæmia, toxæmia.
-agogue, to lead, to carry off, as cholagogue, sialagogue, emmenagogue.
-algia, pain, as dermatalgia, neuralgia, odontalgia, proctalgia.
-cele, hernia, rupture, as cystocele, hydrocele.
-ectomy, extirpation, a cutting, as neurectomy, glossectomy.
-itis, inflammation, as enteritis, cystitis, dermatitis, otitis.
-logy, discourse, treatise, as pathology, biology, bacteriology, histology.
-oid, a form or image, like, as adenoid (like a gland), cuboid, myoid, odontoid.
-oma, tumor, as epithelioma, hæmatoma.
-opia, vision, as myopia (near sight).
-phobia, fear, as photophobia (fear of light), hydrophobia (dread of water).
-rhagia, hemorrhage, rupture, or discharge, as enterrhagia, menorrhagia.
-rhœa, transudation or flux, as diarrhœa, gonorrhœa.

Words Derived from Latin Roots.

caput, the head.
claudo, clausum, to shut, to close or finish.
duco, ductum, to lead or to draw.
fero, latum, to bear, to carry, to bring.
gradior, gressus, to step or to go.
mitto, missum, to send.
pes, pedis, foot.
plico, plicatum, to bend, to fold or to knit.
plecto, plexum, to twine, to weave or to knit.
pono, positum, to put, to play or to lay.
specio, spectum, to see or to look.

WORDS DERIVED FROM GREEK ROOTS.

aster, a star.
chronos, time.
ge, the earth.
gramma, a letter.
grapheim, to write.
hudor, water.
metron, a measure.
phone, a sound.
polis, a city.

ÆTIOLOGY.

What is meant by ætiology?

It is that *division of general pathology* that treats of the cause of disease; or, it is the condition under which disease arises, or the agents through which disease is produced.

How may causes be divided?

We may divide causes into *predisposing* and *exciting;* they may also be divided into internal and external.

What are predisposing causes?

They are certain influences or conditions of the animal body which disposes it to the action of disease by the application of some exciting factor, and may be inherited or acquired.

Anything that will place one or more tissues of the body in such condition as to favor the growth, development, and multiplication of micro-organisms is a predisposing cause.

Define exciting causes.

Exciting causes are those micro-organisms, ptomains, or toxins which may excite disease by operating on an already predisposed body.

What is included under internal or intrinsic causes?

Internal or endopathic causes include *heredity, age, previous disease, breed* or *variety, temperament, idiosyncrasy* or *diathesis.*

The external or exopathic causes include what?

External or extrinsic causes include *atmospheric influences, temperature* (extreme heat or cold), *faulty diet, work, defective sanitary conditions, mechanical causes, micro-organisms, etc.*

What can be said in regard to the causation of communicable diseases of to-day as compared with the past?

The advancement of the science of bacteriology has placed the ætiology of communicable diseases on a new basis.

It is now a recognized fact that pathologists of to-day do not

hesitate to say that each of the infectious diseases is caused by a definite micro-organism or the poisons produced by them.

No doubt most all diseases are produced directly or indirectly by micro-organisms, ptomains, or toxins, as we know that micro-organisms exist most everywhere, merely waiting for the proper conditions for their growth and multiplication.

What are bacteria?

They are microscopic vegetable organisms of the simplest form found in air, water, soil, and decaying organic matter. They are fission fungi or schizomycetes, unicellular, almost always devoid of cholorphyll, generally unbranched, and reproduce themselves by direct division or fission, spores, or gonidia.

Name the main divisions of bacteria regarding form.

1. The globular or spherical-shaped, called *cocci*; 2. straight rod-shaped forms called *bacilli;* 3. curved or corkscrew forms called *spirilla.*

How are the cocci divided?

Into micrococci when small in size; staphylococci or irregular masses; streptococci or chains; diplococci or pairs, tetrads, or fours, and sarcinæ or groups of eights.

How are bacteria divided with reference to disease?

In nonpathogenic and pathogenic.

What are nonpathogenic bacteria?

Those bacteria that do not cause disease, as the tissues are not in proper condition for their growth and multiplication.

What are pathogenic bacteria?

So called when the tissues are in such condition to allow them to develop and multiply in sufficient numbers to injure the tissues, causing disease.

How do micro-organisms gain entrance into the body?

Through the respiratory passages, the digestive system (especially the pharynx), wounds of the skin (especially abrasions), through the generative organs, by insects, etc., and in some cases from mother to fœtus.

What causes them to multiply?

Heat and moisture in the presence of decomposable organic matter are the main factors, especially when the surroundings are neutral, slightly alkaline in reaction, or in some cases very slightly acid.

What influence has sunlight on bacteria?

It is very destructive to bacteria and especially if the rays of the sun come in direct contact with the bacteria.

What effect has oxygen on bacteria?

Some bacteria require oxygen for growth and multiplication and are called *aërobic*; others do not require oxygen and are called *anaërobic*.

What are the functions or products of bacteria?

The products, functions, or manifestations of bacteria are the production of ptomains, toxalbumens, fermentation, pigments, odors, putrefaction, oxidation, nitrification, and also of diseases in man and animals.

What are ptomains?

These are crystallizable basic substances, very much like the vegetable alkaloids obtained from putrefying objects.

What are toxins and toxalbumens?

They are complex noncrystallizable substances, somewhat similar to albumen and protein, produced in the animal organism, are very poisonous and considered to be the prime cause of disease.

What are saprophytic bacteria?

Those bacteria that grow outside of the animal body in dead decaying matter.

What are parasitic bacteria?

Those bacteria that grow within the living animal body.

What conditions are necessary to constitute infection?

(1) The organism must be able, under proper conditions, to produce disease, whether it be nonpathogenic or pathogenic; (2) it must be parasitic, that is, have the power of growing within the animal body; (3) the toxins or poisons must be in sufficient quantity; (4) the animal body must be susceptible, that is, the tissues of the body must be in the proper condition for the growth and multiplication of the organisms in sufficient numbers.

What conditions are usually necessary for an infectious agent to produce disease?

1. The organism must be found in the tissues of the animal having the disease.
2. It must be isolated.
3. It must be grown for generations in culture media.

4. When injected, it must produce the same disease and be found in the lesions.

Name some that fulfil these conditions.

The bacilli of glanders, tetanus, dysentery, anthrax, diphtheria, tuberculosis, bubonic plague, typhoid, malignant œdema; also pneumococcus, streptococcus pyogenes (sepsis), actinomyces, meningococcus, gonococcus, and spirillum choleræ.

Other specific organisms have been found that do not have all the above conditions.

MORBID ANATOMY.

Define morbid anatomy.

This is a division of general pathology, and is the study of the changes in the tissues and fluids of the body, appreciable to the naked eye or with the aid of the microscope.

State some of the benefits to be derived from post-mortem examinations.

To become expert diagnosticians it is essential to verify our forethoughts and conclusions by post-mortem examinations.

We are also enabled to become familiar with the various tissues and organs in the state of health as well as in disease, all of which tends to aid us in future examinations of living subjects.

SEMIOLOGY.

Define semiology or symptomatology.

Symptoms are the language of diseased nature; *symptoms* and *signs* are such alterations in the healthy functions as give evidence of the existence of a diseased condition or perverted function.

Why do we study symptoms?

We study symptoms to enable us to make a *diagnosis* or *prognosis*, and to be able to *treat*.

Symptoms are how divided?

Symptoms may be divided into *objective* and *subjective*.

Define each.

Symptoms are said to be *objective* when evident to the senses of the observer; *subjective*, when felt and complained of by the patient.

Symptoms are also general or local, idiopathic or sympathetic (secondary), premonitory (precursory) or commemorative.

Symptoms may again be divided into *diagnostic, prognostic, pathognomonic, therapeutic.* They may be active (dynamical), passive (statical), positive (direct), negative (indirect).

What is understood by a pathognomonic or pathognostic symptom?

A *pathognomonic symptom* is a symptom or set of symptoms peculiar to any particular disease. Two or more symptoms are usually required to make them pathognostic; for instance, in glanders, the ulcer, the oily-like discharge, and the swollen intermaxillary glands.

GENERAL SYMPTOMATOLOGY.

What is understood by general symptomatology?

It is the study of those symptoms, as *pain,* the *pulse, expression of the face,* the *tongue,* and *mucous membranes,* the *respiration* (including cough), and the *temperature,* not connected with any special disease, but with diseased processes generally.

Describe the varieties of pain.

Sharp, acute, cutting, darting, and lancinating (generally of intermittent character); seen in peripheral nervous troubles, as neuralgia and inflammation of serous membranes. Dull, gnawing, and more or less continuous; seen in chronic tissue change; as a rule, in hepatic and splenic affections and inflammation of mucous membranes. *Exceptions:* In malignant diseases, as cancer, the pain is sharp. The pain is sharp, although there is chronic tissue change. The character of the pain varies, according to the tissue involved. In inflammation of the skin it is burning and itching. In inflammation of mucous membranes it is aching and throbbing. In inflammation of bone it is dull and boring.

Describe the physiognomy of disease.

Some diseases have their own physiognomy (if the expression be permitted), and we can only appreciate the same by continued observation. Certain external appearances, position of the body, etc., come under this head.

What is the pulse?

The *pulse* may be said to be the expansion of the artery, produced by the wave of the blood, set in motion by the overfilling of the aorta at each ventricular systole.

Where may the pulse be appreciated?

Principally, at the lower border of the inferior maxillary bone, along the shin-bones, or on either side of the tail.

Is there any relation between the pulse-beat and the respiration?

In health there is somewhat of a uniformity between the frequency of the pulse and the respiratory movements—about three or four pulse-beats to one respiration. This proportion is not constant in all animals.

How many beats per minute are there in the normal pulse?

The pulse beats about forty times per minute. Anywhere from thirty-six to forty-two may be normal. The corresponding respirations are ten or twelve to fifteen per minute.

In man about the same ratio exists, the average number of respirations being eighteen to the seventy-two pulse-beats.

How should the abnormal pulse be studied?

The pulse should be studied as regards its *frequency* or *infrequency,* its *quickness* or *slowness,* its *largeness* or *smallness* (volume or strength), and its *hardness* or *softness,* as well as its *rhythm.*

What is understood by a frequent pulse?

A *frequent pulse* is one in which the number of beats is greater than usual in a given time.

The frequency has reference to the succession of the pulsations.

An *infrequent pulse* is one in which the number of beats is less than usual in a given time. This often suggests brain trouble.

What is a quick pulse?

A *quick pulse* is one in which each beat occupies less than the usual time, though the whole number, in a given time, may not be much increased.

The quickness is referable to the time occupied by each beat of the pulse.

A *jerking pulse* is a modified quick pulse.

What is meant by a slow pulse?

A slow or long pulse, as it is sometimes called, is the result of a slow auricular systole.

Define a large pulse.

A *large pulse* is seen when the volume is greater than usual.

What is a small pulse?

This is where the volume is less than usual.

What is understood by a hard pulse?

This is where the artery resists compression; the pulse feels like a cord or quill. It is generally associated with an incompressible pulse, and seen in inflammations of serous membranes.

What is a soft pulse?

A *soft pulse* is where the artery can be compressed. It is generally seen in inflammation of mucous surfaces.

What do you understand by an irregular pulse?

This is where the volume and duration are not uniform—that is, it may be a combination of either a hard, soft, frequent, infrequent, large, small, strong, or weak pulse.

Describe an intermittent pulse.

It is where an occasional beat is omitted; this omission may be regular—that is, occurring after a certain number of beats; or, again, it may be irregular, occurring at various and irregular intervals.

RESPIRATION (INCLUDING COUGH).

We must remember the natural relation between the respiration and the pulse, which is not present in disease. In our clinical examinations and observations we must take note of the number of respirations per minute, and whether easy, calm, and full, or difficult, painful, and catching.

What are some of the varieties of respiration?

We have *accelerated breathing, difficult* or *oppressed breathing* (also called dyspnœa), *abdominal, thoracic, irregular,* and *stertorous* respiration.

Define each.

Quickened or *accelerated* breathing is where there is a simple numerical increase of the respirations; seen from any cause which increases the circulation.

Difficult breathing, or *dyspnœa*, is due to some obstruction to the passage of air into the lungs, thus causing labored breathing; seen in diseases of the larynx, trachea, etc.

Abdominal breathing is where the muscles of that region are brought into play almost altogether; seen in pleurisy, hydro-thorax.

Thoracic breathing is where this region is entirely or mostly used; seen in ascites, tympanites.

Irregular breathing is where there is a want of harmony between the inspiratory and expiratory acts; seen in pulmonary emphysema.

Snoring or *stertorous* breathing is characterized by a peculiar sound, called snoring, during inspiration, and ofttimes indicates serious cerebral trouble.

What is understood by a cough?

A *cough* is a deep inspiration, with the closure of the glottis, followed by a sudden forced expiration, which is obstructed on account of the sudden closure of the glottis; the abdominal muscles are then brought into play, pushing the intestines against the diaphragm, which, in turn, presses the air in the lungs till the tension is such as to cause a separation of the vocal cords, with the characteristic sound called cough.

What is the object of a cough?

It is to rid the air-passages of any foreign substance, which is generally mucus.

What are the varieties of cough?

A moist cough, a dry cough, and a suppressed cough.

Define each.

A *moist, expectorant cough* is generally seen in a diseased condition of the mucous membranes of the air-passages where the secretion of mucus is increased.

A *hard, dry, painful, non-expectorant cough* is seen where there is an arrest of the secretions of the air-passages.

A *short, suppressed,* and *painful cough* is seen in inflammations of the serous membranes of the chest.

What symptoms are furnished by the secretions and excretions?

These are often very beneficial in aiding us to diagnose and prognose. They may be increased, diminished, or otherwise altered.

We should inquire about the condition of the bowels and bladder as regards their evacuation. Note the color (dark, bloody, etc.), the consistency (thick or thin), the reaction, odor, and density; then, again, if passed frequently and in small quantities, and if painful.

In regard to the bowels, the odor, color, shape (consistency, quantity, and the number of times).

Very much information may be derived by knowing the condition of the various secretions. If the secretions are diminished, the animal is unable to digest his food properly.

What does the rise of temperature denote, and what is the normal temperature?

In the horse, the average *normal temperature* is 100° Fahrenheit when taken per rectum; above that is an indication of fever.

The *temperature* is very important, and it should be taken twice a day, and at about the same time each day, as the temperature varies at different times of the day.

What temperature denotes a fever?

A *temperature* rising one degree above the normal indicates fever; from 101° to 103° denotes a *simple or slight fever;* from 103° to 104° a *decided fever;* from 104° to 106° a *high fever;* and when above 106½° it *denotes danger.*

TABLE OF THERMOMETRIC EQUIVALENTS.

To convert degrees Fahrenheit into degrees Centigrade, use the following:

$$x^\circ \text{ F.} = \frac{5(x^\circ - 32).}{9}$$

To convert degrees Centigrade into degrees Fahrenheit, use the following:

$$x^\circ \text{ C.} = \frac{9\,x^\circ}{5} + 32.$$

Degrees F.	Degrees C.
95	= 34.999 = 35
96	= 35.555
96.8	= 35.999 = 36
97	= 36.111
98	= 36.666
98.6	= 36.999 = 37
99	= 37.222
99.2	= 37.333
99.4	= 37.444
99.6	= 37.555
99.8	= 37.666
100	= 37.777
100.2	= 37.888
100.4	= 37.999 = 38
100.6	= 38.111
100.8	= 38.222
101	= 38.333
101.2	= 38.444
101.4	= 38.555
101.6	= 38.666
101.8	= 38.777
102	= 38.888
102.2	= 38.999 = 39
102.4	= 39.111
102.6	= 39.222
102.8	= 39.333
103	= 39.444
103.6	= 39.777
104	= 39.999 = 40
104.2	= 40.111
104.4	= 40.222
104.6	= 40.333
104.8	= 40.444
105	= 40.555
105.2	= 40.666
105.4	= 40.777
105.6	= 40.888
105.8	= 40.999 = 41
106	= 41.111
106.4	= 41.333
107	= 41.666
107.6	= 41.999 = 42
108	= 42.222
109	= 42.777
109.4	= 42.999 = 43
110	= 42.333
111.2	= 43.999 = 44
112	= 44.444

Is the temperature of any prognostic value?

Yes; in fevers, for instance, a steady decline denotes a favorable issue, while a rising temperature shows danger. Again, if it remains high when it should fall, it is an unfavorable symptom.

In regard to the indications for treatment, of what use is the temperature?

If the temperature is very high, it calls for antipyretics, as quinine, acetanilid, antipyrin, etc. On the other hand, if the temperature is low, it calls for stimulants, as alcohol, ammonium carbonate, etc.

What benefit may be derived by the appearance of the tongue and mucous membranes?

The general appearance of the visible mucous membranes is very important and aids materially in making a diagnosis, in prognosing, and in the treatment.

What alterations may take place?

Alterations in color, principally. They may become paler than normal in cases of anæmia; increased redness in congestions or inflammations; yellow in liver troubles; slate-color in glanders; bluish in chronic catarrh; may show petechial spots, as in purpura.

What symptoms are furnished by the extremities and the surface of the body?

Normally, these have a warm, genial sensation to the sense of feel, and variations of the temperature of these in disease are of major importance.

In inflammatory processes the ears, the legs, and the surface of the body may be cold—may be deathly cold, as it is termed.

If they keep cold for a length of time, it is an indication of trouble of a grave nature.

If there is also present what is called a "cold sweat," the life is in danger.

DIAGNOSIS.

What is understood by the term diagnosis?

This is a branch of general pathology, and comes from the Greek *dia,* meaning "through," and *gignosko,* meaning "I know" —I know through, or a looking through, or a thorough knowledge.

It is the art of discriminating one disease from another, or the discovery of disease by means of its symptoms.

What use is diagnosis?

We make a *diagnosis* in order to enable us to prognose, and also to treat the various diseases.

What is understood by a direct diagnosis?

It is a *diagnosis* made when the morbid condition is revealed by a combination of clinical signs, or some one or more pathognostic symptoms.

What is a differential diagnosis?

It is the art of discovering the disease which is present by a careful comparison of its symptoms with those of other diseases which may closely resemble it.

What is understood by a diagnosis by exclusion?

It is the proving of the absence of all diseases which might give rise to the symptoms observed, except one. In other words, it is a *negative proof.*

PROGNOSIS.

What is understood by a prognosis?

This is another division of general pathology, and comes from the Greek *pro,* "before," and *gignosko,* meaning "I know"—"I

know beforehand"; or it is the art of foretelling the issue of disease. It may be general, as in lung fever, or it may be special, as in any given case.

It is the ability or knowledge to foretell the most probable result of the condition present, and involves an amount of tact or knowledge only acquired by prolonged clinical experience.

TREATMENT.

What is treatment?

This is the last *division of general pathology*, and is the most important object in the study of veterinary medicine, from a practical stand-point; to learn how to cure, relieve, or prevent disease is of no minor importance, and it is to be remembered that this does not consist only in the giving of drugs, but requires strict and faithful attention to the diet and hygiene.

Treatment is the art of preventing, or taking care of the sick and alleviating their sufferings, or of aiding and hastening their cure.

What is meant by prophylactic treatment?

This is where the object is to prevent the spread or development of disease; it also receives the name of preventative treatment.

What is understood by abortive treatment?

This is where the disease is cut short and prevented from running its regular course, or when the disease is to be broken up, although already begun.

What is expectant treatment?

This is where the disease is allowed to run its regular course, without trying to remove it, but being on guard for any obstacles to its successful issue; this is seen in continued fevers.

We should try to assist Nature; do not try to improve her.

What is meant by restorative treatment?

This is where the aim is to build up the system and supply something wanting in the system, as phosphates in rickets, and iron in anæmia.

What is radical treatment?

This is where a rapid impression is made upon the system and the course of a disease is cut short.

Define palliative treatment.

It is where suffering is allayed, or, where the disease is incurable, the symptoms moderated and the suffering relieved.

2. DISEASE.

Define disease.

Disease may be said to be a deviation of an organ from the normal, either in function or structure, or both.

How may diseases be divided?

Into *functional* and *organic diseases.*

Give the definition of each.

A *functional disease* is one in which there is an alteration of the function of an organ, there being no structural change.

An *organic disease* is where there is a change in function due to some structural alteration.

What is infection?

Infection is not only the entrance into the body of living micro-organisms, but also the invasion into the tissues; the latter being in such receptive condition as to allow the growth and multiplication of the organisms.

Can bacteria be in the body without infection?

Yes. Bacteria in countless numbers are present and do no harm unless the tissues are in the proper condition to allow them to multiply in great numbers.

Do these micro-organisms do harm?

They do when conditions are favorable to their growth and multiplication, in which case they cause diseased conditions or death.

Is there any other way these bodies cause disease?

Yes. Some produce poisons called toxins which do the damage. The cases are called *intoxications* or intoxicative processes.

What is contagion?

Contagion and infection are generally used to indicate one and the same thing. Although difficult many times to draw a line between them, contagion should point to those cases where the

micro-organism is directly carried from one animal to another by direct contact, while infection comes through the air, soil, or places, not being a living body.

Define a contagious disease.

It is a disease due to a specific cause, capable of being reproduced in the body, and of being directly transmitted from the sick to the well; for example, glanders, small-pox.

What is an infectious disease?

It is one which is due to a disease germ introduced into the economy from without, but not capable under ordinary conditions of being reproduced in the body, hence not communicated from one animal body to another, as influenza, tubercle. This is sometimes called a *miasmatic* disease.

Diseases are spoken of as *communicable* and *noncommunicable*. The *communicable* are divided into two classes—the *specific*, as glanders and small-pox, and the *septic*, as erysipelas. Communicable diseases are those that have existed in an animal body before.

The *noncommunicable* diseases are caused by morbific agents which do not come from an animal body, but have their origin in a place or thing, as malarial fever, yellow fever in the human subject.

Define a specific infectious disease.

It is one caused by a single species of micro-organism which multiply in the animal body, producing general or local symptoms nearly the same in every case; that is, these organisms always produce the same disease.

Contagion spreads how?

Principally by absolute contact with the poison, by inoculation, by food or water, through excreta, by stable utensils, etc.

Define a sporadic disease.

It is one that occurs in isolated cases—that is, where a disease of an infectious or contagious nature manifests itself in one animal.

What is an enzoötic disease?

This term comes from the Greek *en*, "in," and *zoön*, "an animal."

It is where a number of cases occur in a limited locality, due to the same cause.

Define an epizoötic disease.

It comes from *epi*, "upon," and *zoön*, "an animal." It is a disease that is widely spread over a community.

What terms in human medicine describe similar conditions?

The terms endemic and epidemic.

Define a panzoötic disease.

This is a disease that is infectious or contagious, and spreads from one country to another.

What is a zymotic disease?

This is a disease of a contagious nature, but produced by the action of a ferment.

Name some of the uses of the ferments.

Diastatic, which change starch into sugar; *proteolytic*, which make proteids soluble; *tryptic*, which are gelatin liquefiers; *invertin*, which change cane sugar into grape sugar, ferments that curdle milk.

3. TERMINATION OF DISEASE.

How do diseases terminate?

It may occur in one of three ways: either by a *cure*, *secondary processes*, or *death*.

A cure may take place in what way?

It may take place by a *lysis*, which is a gradual withdrawal of the diseased action—that is, a slow return to health. Or by a *crisis*, which is an abrupt ending, generally with a critical discharge—that is, it is a sudden change, for better or worse. Or by a *metastasis*, which is the changing from one location to another, or the shifting of the disease.

What is understood by the secondary processes?

By this is meant when the diseased action is substituted by a new morbid process, as rheumatism followed by heart trouble, or apoplexy by cerebral softening.

What is death?

It is a complete cessation of tissue change, or a cessation of all functions, the aggregation of which constitutes life; or a complete

cessation of the bodily functions and of reconstructive change. The blood must be pure arterial blood, and must circulate to sustain life. If it stops circulating death is the result.

What are the vital organs?

The heart and blood-vessels, the lungs and the nervous system. Each of these must continue its work, or life will stop. Their functions are called "the vital functions"—*circulation, respiration,* and *innervation.*

4. MODES OF DEATH.

Through what channels may death occur?

Beginning at the heart, the lungs, or the brain.

Death beginning at the heart takes place how?

It may take place in one of two ways: suddenly or by syncope, or by a gradual cessation. Death by syncope may occur in one of two ways: by *asthenia* and loss of irritability—that is, without the strength to contract; or by *tonic spasm,* where the organ remains contracted till death. By gradual cessation of function, it takes place by *anæmia*; this is seen after a hemorrhage, where there is insufficient quantity and quality of the blood.

How does death occur by anæmia?

The heart must have blood and the power to keep life in existence; in anæmia there is not enough blood, and it is of too poor a quality to nourish the tissues. The heart may have the power to contract, but it is empty.

How does asthenia cause death?

This comes from *a,* "without," and *sthenos,* "strength." It may take place suddenly when caused by lightning, blows in the abdomen (causing death by paralysis of ganglia). The heart is dilated and filled with blood, but unable to contract. It takes place slowly, as seen in long lingering diseases, where there is loss of nerve force, as in pleurisy; or, again, in animals that are starved; or, if any part of the alimentary tract is occluded by tumors, constrictions and the like.

Death beginning at the lungs occurs how?

The blood remains partly venous by some obstacle of the entrance of air to the lungs, and occurs when the respiratory muscles fail to act.

This is improperly called *asphyxia*, which is, literally, pulseless; it is more properly called *apnœa* (suffocation).

First, when sudden, as from suffocation, or strangulation, or drowning.

Second, when more slowly, as from pulmonary apoplexy, congestion, as when the animal is driven to death, the blood accumulates in the vessels of the lungs. *Asphyxia* means without pulse, while *apnœa* means without breath.

In what cases is death due to asphyxia?

In such cases as drowning, inhaling poisonous gases, as smoke, etc., and also choking. In tetanus, or strychnine poisoning, the chest-walls become immovable; again, injury to the spinal column high up in the cervical region (pithing). The entrance of air in the pleural cavity, or a great effusion.

How does death from apnœa occur?

In acute lung diseases the air cannot pass down; here venous blood circulates in the arteries. In tympanitic colic the gas presses the diaphragm against the lungs and shuts out the air.

Death beginning at the brain takes place how?

It takes place by *coma*, which means a deep sleep. In coma the function of the brain is suspended and causes secondary trouble, as the want of contraction of the chest-walls. Apoplexy (hemorrhage in the brain), or pressure of fluids, causes death at the heart, but primarily at the brain, as seen in cerebral meningitis, where the products of the inflammation cause pressure. Certain drugs, as opium, if used improperly, will cause death in this way. Certain waste products, as urea, accumulating in the blood, cause uræmia.

SECTION II.

INFLAMMATION.

Define inflammation.

It is a series of changes which take place in the living tissue, when injured, provided its vitality and structure have not been destroyed.

What is the first step to an inflammation?

Irritation.

What occurs miscroscopically in the tissues?

1. *Vascular changes* (changes in the vessels and circulation).

2. *Exudative changes* (exudation of the liquor sanguinis and emigration of the blood-cells).

3. *Parenchymatous changes* (alteration in the nutrition of the tissues).

Explain the vascular changes.

The first change observed is a change in the circulation; there is a change of color of the part, which becomes red and congested; the vessels dilate, and more blood is brought to the part. The hyperæmia is active at first—that is, there is an increased amount of blood in the vessels, and more blood is brought to the affected part by the capillaries. The current soon becomes slower, the blood-vessels contract, and finally the flow may stop altogether; this is called stasis.

Which cells migrate?

Both the red and the white corpuscles.

Describe the exudation of the liquor sanguinis and the emigration of the cells.

The liquor sanguinis goes through the walls into the surrounding tissues and forms lymph; it coagulates, on account of containing fibrin factors.

The looser the meshes, the more effusion and the less pain. If the structure is tough and resisting, the pain becomes intense. The white cells stick to sides of the vessels, the red remaining in the centre of the stream. The white gradually go through the walls of the vessels and get outside.

Where the stasis is more marked the red cells do the same.

What are the parenchymatous changes?

The cellular elements of the tissues undergo change in form and nutrition. The chemical interchanges which constitute normal nutrition, and which are carried on between the cells of the tissue and the liquid furnished to the cells by the blood, are modified in character or extent, and the cells themselves are modified in form. The white cells increase in size and divide, and the connective-tissue cells do the same; some form new cells, while others undergo fatty degeneration.

What is the ætiology of inflammation?

The causes may be *traumatic, toxic, parasitic, infectious, constitutional, trophic, metastatic.*

How does traumatism cause inflammation?

Either *mechanically,* in shape of cuts, pressure, crushing, etc.; or physically—extreme heat or cold, electricity, modification of temperature; or *chemically*—acids, alkalies.

What are the toxic causes?

These act indirectly from chemicals introduced from without, as arsenic, phosphorus, etc.; or are formed in the body, as the products of putrefactive changes.

In what way do parasites cause inflammation?

The vegetable parasites are mostly fungi, and act locally on the skin and mucous membranes, as favus, thrush. The animal parasites act locally at their entrance, or in remote parts, from reproduction.

The infectious causes are what?

The diseases produced in this way are caused by bacilli special to that particular disease, as the bacilli of tuberculosis, glanders, erysipelas, etc.

Explain the constitutional causes, the trophic causes, the metastatic causes, and the spontaneous causes.

The *constitutional* causes of inflammation are certain changes in the composition of the blood. The *trophic* causes are supposed to take place through the nervous system. The *metastatic* causes are where a disease shifts from one place to another, as pneumonia followed by laminitis. *Spontaneous* inflammations do not exist, and the term should not be used, although when we are unable to attribute any cause we say spontaneous, in order to differentiate.

What are the clinical symptoms of inflammation?

These are called local or cardinal symptoms, and are *redness, swelling, pain,* and *heat;* to these we add a fifth—*impaired function.*

The redness is due to what?

It is due to an increase in the amount of blood in the part. The presence or absence of redness is not proof of the presence or absence of inflammation.

What causes the swelling?

First, the congestion of the vessels of the part, and, secondly, the exudation of the liquor sanguinis.

How is the pain produced?

It is caused by pressure on the nerves by the inflammatory exudation, and is called inflammatory pain. Pain is not always significant of inflammation, as neuralgic pain or the pain in colic.

What causes the heat?

The increase in the amount of blood in the part, causing increased chemical changes.

The impairment of function is how explained?

This cannot always be appreciated directly, but is of much clinical importance. In brain troubles, coma or delirium; in bowel trouble, diarrhœa; in stomach trouble, anorexia.

Enumerate some of the general symptoms of inflammation.

The *general* or *constitutional symptoms* vary with the kind, form, and seat of the inflammation. They are very important and are indicative of symptomatic fever, showing the nature of the dis-

ease, which may be internal. *Nervous symptoms* may be present, as pains of various sorts, according to the location. *Vascular symptoms,* changes in the pulse, etc. *Respiratory symptoms,* as those already alluded to. *Digestive changes* may be prominent, some alterations in the secretions and excretions, or some interference with the nutritive processes.

What are the forms of inflammation as regards their situation?

They are *superficial* when the outer parts of an organ are involved, and *deep* when the deeper portions are the seat.

The deeper inflammations may be *parenchymatous* when the tissue proper is involved, and *interstitial* when the connective tissue is involved.

What is an exudation?

It is derived from *ex,* meaning "out," and *sudo,* signifying "I sweat." It is an accumulation of lymph, or serum, or plasma, or fibrin, or corpuscles (red or white), or a combination of any two or all of the above named.

Name the varieties of exudation.

Serous or fibrino-serous, fibrinous, purulent or fibrino-purulent, catarrhal, croupous, diphtheritic, hemorrhagic.

Describe serous or fibrino-serous exudation.

The exudations of inflammations of serous membranes consist of serum, fibrin, or pus, in variable proportions. The first change causing a serous exudation is an increased amount of blood in the blood-vessels of a part; then a coagulation of fibrin elements.

If the inflammation occurs in the pleura or peritoneum, serum is mostly always present, and, if in great amount, it is called a *serous exudation.* If part be serum and part fibrin, it is called a *fibrino-serous exudation.*

What are a fibro-purulent and a purulent exudation?

When leucocytes are present in large numbers, the exudation is termed *fibrino-purulent.* The greater the intensity of the inflammation and the more enfeebled the patient, the more likely is pus to form. When there is a quantity of pus present it becomes a *purulent exudation.* If blood be present from a rupture of capillary vessels, the exudation is termed a *hemorrhagic exudation.*

What is a fibrinous exudation?

New connective-tissue cells are formed, the membrane becomes thickened, and elevations are present on the surface of the membrane, causing adhesions. This new connective tissue is rich in capillary vessels at first. Soon the new tissue contracts, fatty degeneration commences, and absorption takes place.

Inflammations of mucous membranes are of what character?

Catarrhal, croupous, or diphtheritic.

Explain a catarrhal mucous inflammation.

In acute cases the mucous membranes are drier in the beginning and congested. Soon the glands secrete, and the mucus may be thicker or thinner than normal, and has an acrid or irritating quality.

Do mucous exudations coagulate?

Mucous exudations do not coagulate, but adhere somewhat closely to the surface of the inflamed membrane; these changes are accompanied by a shedding of the superficial epithelial cells.

What takes place if pus-cells are formed?

If the catarrhal inflammation is of a purulent nature, the above condition is present, together with a darkening of the mucous membrane and the formation of pus-cells. The amount of pus will indicate the intensity and character of the inflammation.

What are the changes in chronic catarrhal inflammations?

The blood-vessels are either increased in size and number, or they are less numerous and more swollen, giving the membrane a grayish appearance.

Describe croupous inflammations of mucous surfaces.

The hyperæmia is more intense than in the catarrhal inflammations, the membrane becomes of a dark, livid color and swollen; soon the free surface shows a fibrinous exudation, which takes the place of the epithelium and lies upon the sub-epithelial structures. Enclosed in the meshes are epithelial and pus cells. The exudation varies in thickness, and may be in patches or extend over a considerable surface. At first it is firm, hard, and adheres closely, but soon it becomes softer and can be easily detached from the subjacent membrane.

What is diphtheritic inflammation of mucous surfaces?

By some this form is regarded as the same as the croupous variety.

The hyperæmia seems more intense, the infiltration more extensive, the fibrinous exudation more abundant and granular; greater changes take place in the epithelial and tissue cells, the membranous exudation cannot be removed without a loss of substance, and multitudes of bacteria, especially the micrococci, are found on the surface and in the infiltrated tissues beneath. Sometimes the pressure is so great as to cut off the nutrition, the part dying and sloughing away.

What is meant by a parenchymatous inflammation?

In this form the cells proper of the organs—that is, the cells which perform the function—are the parts affected.

In acute parenchymatous inflammations what takes place?

If mild, the cells increase in size, are granular, opaque, and their functional activity is increased; the blood-vessels contain more blood, the stroma is infiltrated with serum, and the affected organ is slightly increased in bulk, which, however, returns to the normal if resolution takes place.

If the inflammation be intense in character and prolonged, the cells are destroyed, the circulation checked, the stroma is infiltrated with serum and pus, the organ increased in size, of a purplish color, and the functional activity arrested. Fatty change takes place and the cells disintegrate, the walls of the blood-vessels become thicker, the calibre lessened or obliterated, the stroma increased on account of the new tissue being formed, the function becomes impaired and never returns to the normal, owing to the permanent changes.

Describe an interstitial inflammation.

The connective tissue of the organ becomes affected. If acute, suppuration usually occurs, which is limited to small areas, or it may be diffused. If only a few pus-cells form, resolution is possible, while if many pus-cells are present abscesses develop which have firm walls. If chronic, which is generally the case, it ends in induration and cirrhosis by the formation of new connective tissue without the formation of pus. The new tissue corresponds in kind to the original stroma of the organ, and is permanent, the affected organ never returning to the normal.

What kinds of inflammations are there?

Specific and non-specific.

Define specific inflammations.

Specific inflammations are those caused by bacteria that reproduce the same local inflammation with certain definite constitutional symptoms, and never cause any other, as glanders, actinomycosis, tuberculosis.

What is a non-specific inflammation?

It is one caused by bacteria which do not produce their own kind, and one can never tell the form of inflammation that may occur, as synovitis, peritonitis, cellulitis, gangrene.

How may inflammations terminate?

They may terminate in resolution, production, or destruction.

What is meant by resolution?

This is where the symptoms of inflammation subside and a favorable termination takes place; the parts are restored to their normal condition. The liquid portion of the exudation becomes absorbed, the cellular elements undergo fatty degeneration and are also absorbed.

Explain the meaning of production.

When inflammations end in *production,* there is the formation of new connective tissue, which in many instances becomes a permanent part of the body. This new tissue may fill up a gap where there has been a loss of tissue, and is called a scar. When opposed surfaces are united by the new-formed tissue, the term adhesion is used.

How may inflammations end in destruction?

Ulceration, suppuration, or *mortification* may take place. This occurs when the nutrition of the inflamed tissue is so diminished as to be insufficient for its preservation. The more complete the stagnation in the blood-vessels, the more likely the part is to die.

What is ulceration?

This may be said to be molecular death. It is one of the terminations of inflammation and is a solution of continuity without a tendency to heal or the formation of pus on a free surface. There is a destructive inflammation, with a loss of substance, on the skin

or mucous membranes, and the spot remaining after a loss of substance is called an *ulcer.*

Explain the termination of inflammation by suppuration.

There is the formation of pus, and caused largely by micro-organisms. The pus formations may be local (in one large abscess), or they may be diffused (distributed in smaller points).

What is gangrene or mortification?

This is the death of a part due to a stoppage of the nutrition, and the part dies. The part thrown off is called *a slough.* If the tissue be soft the dead portion is called *a sphacelus;* if of hard tissue, as bone, it is called *necrosis,* while gangrene of the blood is called *necræmia.*

What are the indications for treatment of inflammations?

First, try to ascertain the cause and remove it. If due to chemicals, give their antidotes; if due to a new growth, destroy it; if a mechanical body, remove it; if an irritant to the stomach or bowels, give emetics or purges. When the cause cannot be found, treat the symptoms as they arise, which is usually the mode of treatment for most internal inflammations. In olden times bleeding was extensively resorted to, but has now been almost entirely abandoned, except, possibly, in young plethoric animals. In large cities the animals usually require all the blood they have to withstand the disease.

Aconite or veratrum viride have important actions, in the first stages of acute inflammations, on the heart, which is excitable, beats strongly and rapidly; again, the vessels of the inflamed part are dilated at first, causing a congestion, which should be overcome before stasis takes place.

After the first stages, the treatment should be almost the opposite; instead of sedatives, stimulants should be given to increase the blood-current to try to overcome the obstruction; nitro-glycerin is here an important drug, and it may be combined with strophanthus and digitalis.

Other drugs commonly used are ammonium carbonate, alcohol, belladonna, quinine, opium, potassium iodide, potassium nitrate, colchicum, nux vomica.

What is the local treatment of inflammation?

Hot fomentations, in the shape of hot water, hot poultices, especially if suppuration is present and we desire to hasten it. The

application of cold in other cases, ice-bags, ice-water, to retard suppuration. Counter-irritation, in the shape of mustard, blisters, liniments, etc. The use of disinfectants, both internally and externally, should not be forgotten. Regulate the diet and the hygienic surroundings.

What is meant by atrophy?

It is a diminution in the amount of a tissue, either in size or number of its histological elements, accompanied by loss of weight and impairment of function. Atrophy may be simple and numerical; also general and partial.

What is understood by degeneration?

It is an alteration in the quality of a tissue, with impairment of function. Degeneration may be divided into two classes: *Infiltration* and *metamorphosis.*

Define each.

Infiltration is where foreign matter from without is deposited inside the cells, the cells not being destroyed nor their function interfered with.

Metamorphosis is where the cell is changed into some other substance. There is destruction and softening of the cell.

SECTION III.

CLASSIFICATION OF DISEASES.

How are diseases classified?

They are classified into GENERAL DISEASES and LOCAL DISEASES.

How are general diseases subdivided?

They are subdivided into I. FEVER; II. BLOOD DISEASES; III. INFECTIOUS DISEASES; IV. CONSTITUTIONAL DISEASES.

What are included under the head of local diseases?

The diseases of the various organs or systems which are not included under the head of general diseases.

I. GENERAL DISEASES.

FEVER.

Define fever.

Fever may be defined to be an altered condition of the body heat, or a combination of disturbances in the physiological processes of the body, whose most frequent and outward sign is the rise in temperature.

How is the heat of the body maintained?

First, Heat must be produced or introduced into the body; *secondly,* it must be discharged from the system; and, *thirdly,* a balancing process is required to regulate the same, which is the nervous system.

How are fevers characterized?

1. *By the temperature being elevated.*
2. *By an increase in the circulation.*
3. *By a change in the secretions of the body.*
4. *By a wasting of the tissues of the body.*

What kinds of fevers are there?

There may be said to be two kinds—*essential* fever and *symptomatic* fever.

Define each.

Essential fever (sometimes called idiopathic fever) is one in which no local affection causes the symptoms of fever, although lesions may arise during its progress.

Symptomatic fever (organic or secondary fever) is one dependent on an acute inflammation.

How many stages may fever be divided into for study?

Into *three* stages:

1. *Initial, pyrogenetic,* or *stage of attack.*
2. *Fastigium, acme,* or *stage of development.*
3. *Defervescence,* or *stage of decline.*

What takes place during the first stage of fever?

A chill or rigor usually precedes, which lasts one or two hours or may be very short; the hair on the body stands erect, is dry, and is designated a staring coat. Muscular tremblings are present, the legs and ears are cold to the feel, the surface of the body being of an uneven temperature; there is dulness and depression of the animal, the head down, and little or no notice is taken of the surroundings. Muscular pain is present, shown by the animal resting a limb and showing no desire to move.

The pulse is small, quick, and hard, giving the impression of a cord or quill.

The respirations are short and quick, otherwise not altered in character.

The temperature is elevated to 102°, 103°, 104° F., even when the surface of the body is cool.

The visible mucous membranes are pale or bluish in color, and feel colder than natural. The secretions are diminished, as well as the excretions. The appetite is impaired.

Describe the second stage of fever.

This is called the hot stage, or stage of development. The muscular contractions relax, the blood fills up the cutaneous vessels, the hair falls, is smoother, glossy, and may be moist after a time, with perspiration, which generally takes place at the onset in patches, and the surface of the body is warmer to the feel, the temperature being increased.

The pulse changes; it becomes softer and fuller, but still remains rapid.

The respirations are freer, but still accelerated; the mucous membranes are heightened in color, the animal loses the dulness, pricks up its ears, looks around, and takes more notice.

There is an absence of secretions and excretions, very little if any urine and fæces being voided, and if so in small quantity and high-colored. Changes in the tissues take place from the conditions present, and emaciation begins.

Thirst is prominent, appetite still more or less impaired, *the temperature* remains high for two or three days or more, until defervescence takes place.

What occurs in the third stage of fever?

When the fever is at its height, the temperature begins to fall and the symptoms of fever to subside. When the fever is high the organs cannot perform their functions thoroughly, but as soon as it falls the organs begin to act.

Fever may end suddenly or slowly—that is, there may be a sudden dropping of the temperature or a gradual reduction to the normal.

Name the forms of fever.

Four forms of fever have been recognized, namely: *Simple, inflammatory, nervous, hectic.*

Simple fever is what?

This is a slight form of fever, with no local complications. Often seen in young and vigorous animals.

Define inflammatory fever.

This is also called *synocha*, and is associated with some inflammatory conditions. The chill is very severe, the temperature high, great depression and prostration are present.

Explain nervous fever.

This is termed *typhoid fever*, but it is a question whether typhoid fever really exists in the horse. The temperature is irregular, pulse weak and quick, the visible mucous membranes are dry and covered with a gluey secretion, extremities cold, diarrhœa, and signs of collapse.

What is understood by hectic fever?

This is called *marasmatic fever*, or *fever of emaciation.*

This is a form of fever associated with chronic affections where wounds exist, and is characterized by progressive emaciation.

As regards the progress, how are fevers divided?

Into *continued, periodical,* and *eruptive.*

Define a continued fever.

A continued fever is one characterized by the temperature being more or less elevated throughout the disease.

What is understood by a periodical fever?

This is a fever characterized by the distinct *periodicity* of the symptoms, having intervals when the patient is wholly or completely free from fever.

What is a remittent fever?

This is a paroxysmal fever, characterized by exacerbations, the patient having more or less fever throughout the disease.

The febrile phenomena are truly continuous, but they increase from time to time and diminish at others.

Define an intermittent fever.

In this form the fever totally disappears during a certain time, to reappear again after a determined lapse of time. This is called fever and ague, or chills and fever, in the human subject, and is caused by the bacillus malaria.

Intermittent fever may assume what types?

When the fever occurs daily and the apyrexia lasts twenty-four hours, it is called *quotidian.* When the fever occurs every third day, the apyrexia lasting forty-eight hours, it is called *tertian.* When the apyrexia lasts seventy-two hours, the attacks taking place every first and fourth day, it is called *quartan.*

Enumerate some of the causes of fever.

Excitement, sudden atmospheric changes, infection, congestion of an organ, changes in the composition of the blood, hemorrhages, inflammation, gangrene, suppuration.

Give the indications for treatment of fever.

1st. *Reduce the symptoms of fever,* as excitement, respiratory disturbance, and elevated temperature, especially if excessive.

2d. *Assist the system to establish a reaction.*

3d. *Combat unexpected symptoms.*

The indications, then, for treatment are: *Reduce the tempera-*

ture, regulate the circulation, keep up secretions, and give *easily digested food.*

During the chill, warm blankets, legs hand-rubbed and bandaged, a light, clean, well-ventilated stall, but of moderate temperature.

If the pulse is strong and full at the onset, aconite or veratrum viride may be used; in other cases stimulants may be indicated, such as ammonium carbonate, alcohol.

If the temperature be very high, quinine, antifebrin, antipyrin, acetanilid, salines, as potassium nitrate in drinking-water or food.

Laxatives, or even purges, may be indicated.

Careful attention to the food is important. Bran mashes, grass, carrots, apples, steamed oats, and small quantities of hay. Coax the animal to eat, if only a small quantity.

II. DISEASES OR CHANGES IN THE BLOOD.

ANÆMIA.

What are the synonyms?

Spanæmia, hydræmia, oligocythæmia.

Oligæmia is a lessening in the amount of blood.

Ischæmia is a localized anæmia.

Define anæmia.

It is a condition where there is a diminution in the number of red blood-corpuscles and albumin.

What is the ætiology?

May occur in very young or very old animals; nervous, irritable horses, as well as pregnancy, all act as predisposing causes.

Insufficient quantity and quality of food, bad hygienic surroundings, overwork, lack of exercise, drains on the system from acute or chronic diseases.

Poisons in the blood, suppurations, repeated purgings or bleedings, excessive weather, either hot or cold, are also among the causes.

What are the post-mortem appearances?

The tissues are pale, thin, shrunken, and bloodless. If the disease is of long standing, fatty changes can be noticed in the various tissues. The blood is thinner and coagulates imperfectly,

from the diminution of the fibrin elements; the blood is brighter in color, on account of the lessened number of red blood-cells and the amount of hæmoglobin.

Give the symptoms of anæmia.

There is pallor of the mucous membranes; the Schneiderian, the conjunctiva, and the mucous membranes of the mouth are pallid or often bluish. At times there is catarrh of these membranes. There are less oxygen carriers, and thus the temperature of the body is lowered; the extremities are cold to the feel, a cold sweat being often present.

There is muscular weakness, a small, frequent, feeble, and compressible pulse; there is a soft systolic murmur over the heart, difficult to detect in our animals; the heart-sounds are muffled, and there is a venous hum in the jugular.

The respirations are accelerated, especially on the least exertion, the animal being very easily fatigued. The appetite becomes impaired, as does digestion. Œdematous swellings are often seen on the under surface of the abdomen and along the sheath. The skin becomes harsh and dry.

How is anæmia diagnosed?

The diagnosis can be readily made by the symptoms.

What is the prognosis?

It is determined by the conditions present; favorable if seen early and the horse is not too old and run down, and the anæmia is not due to organic changes, the result of malnutrition.

Outline the treatment of anæmia.

Remove the cause, if possible. Give laxatives or purgatives, according to the indications, and follow these by the use of stomachic tonics to aid digestion. For the anæmia, give iron, with quinine and ginger; other drugs indicated are strychnine, arsenic, phosphorus, gentian, mineral acids.

Build up the system by the proper quantity and quality of food. Stimulants are often indicated. Good hygienic conditions, such as pure air and sunlight, are very essential. Moderate exercise, short of fatigue; turning out to grass in most cases.

POLYCYTHÆMIA.

What are the synonyms?

Plethora, polyemia, polyæmia.

Define polycythæmia.

This is a condition with an increase in the number of red blood-globules and albumin.

What are the symptoms and diagnosis?

There is danger of congestion of various organs. Hemorrhages may be present; the veins are prominent and full of blood. The pulse is quick, strong, and full, the heart-beat is more distinct, the temperature rises a little, the surface of the body feels warm, the mucous membranes of the nose and eyes become reddened.

THE DIAGNOSIS is easy, plethora not being a disease itself, but leads to disease.

What are the post-mortem appearances?

The tissues are of a deep red color on account of the blood-vessels being engorged. Capillary hemorrhages may be present.

What are the causes of plethora?

It occurs mostly in young, vigorous animals, before they get their growth, especially when they are fed on highly nutritious food in large quantities and not enough exercise in proportion.

What treatment is recommended?

Reduce the system, principally by dieting, giving a less amount of food of a bland nature, and advise exercise.

General bloodletting is recommended in some cases, although purging acts about as well and is more commonly used. An aloetic pill, linseed oil, or some of the salines.

LEUCOCYTHÆMIA.

Give the synonyms.

Leukæmia, or leucæmia.

Define leucocythæmia.

It is a general disease, rather chronic in its course, characterized by an increase of the white cells, with an enlargement of the spleen, lymphatics, and marrow of the bone.

Give the causation.

This disease was first described by Bennett, and then by Virchow, in 1845; it occurs in the horse, dog, ox, pig, and cat.

The real cause and nature of the disease are not very well understood, although it is probably of specific origin.

What is the morbid anatomy?

There is an increase in the number of white corpuscles, averaging about one white to fifty, twenty, or fifteen of the red blood-cells, whereas, normally, the proportion is about one to three hundred and fifty or five hundred.

The blood is very pale and watery, and hardly stains the hands. It coagulates very slowly, having three layers—the *buffy coat*, then the *pus-like layer*, and the *crassementum*—whereas, normally, the blood, after coagulating, is all one color; when three layers are present, it is said to be pathognomonic of this affection.

If the heart be examined, it will be found filled with clots which are soft and greasy-like. The spleen is enlarged, weighing as much as ten to fourteen pounds, whereas, normally, it weighs from one and one-half to one and three-quarter pounds. Peyer's patches, the lymphatics, or the marrow of the bone may be involved in this disease. If one of these enlarged glands be cut through, the section is soft and smooth, and the cut surface presents a dirty white color, which, if scraped with a knife, a pus-like fluid is obtained, found to contain mostly leucocytes when looked at under the microscope.

What are the symptoms?

Early, the symptoms resemble those of simple anæmia. The symptoms usually show themselves slowly, and the first thing noticed is the loss of strength and energy; the horse seems to become lazy, while formerly it was high-lifed and vigorous, it now becomes fatigued on the least exertion, puffs, and breaks out in a sweat. There is thirst, capricious appetite, feeble and accelerated pulse, the temperature varies from 101° to 104° F.; constipation early, followed by diarrhœa.

As the disease progresses, the animal gets weaker and weaker, knuckles over, has signs of vertigo, roaring due to the enlarged glands, in which case the horse stands with the legs separated and head extended in order to get air.

Death is due to asthenia and is preceded by delirium and coma.

How is the diagnosis made?

By the history and symptoms; also by the examination per rectum, which reveals enlarged lymphatics in the abdominal cavity near the kidneys; also by the examination of the blood under the microscope.

What is the prognosis?

It is very rarely diagnosed before death, and the prognosis is very unfavorable.

What treatment may be employed?

The various drugs used seem to be of no avail, as the animals become weaker and weaker, and finally succumb.

The treatment is symptomatic; iron may be given; also arsenic, quinine, ergot, cod-liver oil, oil of eucalyptus, iodide of potassium. Inhalations of oxygen have been recommended.

Good food, as well as good hygienic conditions, are of the utmost importance.

HYPERINOSIS.

Name the synonym.

Hyperplasma.

What is hyperinosis?

It is a condition where there is an increase of the fibrin in the blood.

What is the pathology?

It is a condition present in all inflammatory processes, and in some debilitating diseases.

Normally, the average amount of fibrin in the blood is two to four parts per thousand, while in this condition about fifteen parts are present. In inflammations of various organs, the fibrin elements are apt to form heart-clots.

What can be used in these cases?

Heart-clots can be prevented usually by the use of diffusible stimulants, such as ammonium muriate and carbonate, potassium carbonate, sulphate or nitrate, or sodium sulphate or carbonate.

Good food to help build up the system. Iron and mineral acids may be used.

HYPINOSIS.

What is the synonym?

Hypoplasma.

Define hypinosis.

It is a condition of the blood in which the fibrin is diminished.

In what diseases or conditions does it exist?

It is present in purpura hæmorrhagica, in anæmia, in prolonged suppurations, in animals overworked, with improper food. There is a defective coagulating power of the blood, which is not perfectly arterialized.

What are the indications for treatment?

Build up the system by giving good food, moderate exercise, fresh air. Tonics, stimulants, etc., are also beneficial.

III. INFECTIOUS AND EPIZOÖTIC DISEASES.

INFLUENZA.

What are the synonyms?

Catarrhus epizoöticus (epizoötic catarrh), febris catarrhalis (catarrhal fever), pink-eye, horse ail, horse disease, typhoid fever, la grippe, gastro-conjunctivitis.

Define influenza.

It is a specific febrile disease, assuming various forms, characterized by a catarrh of the mucous membranes of the respiratory tract, and in some instances of the digestive tract, and associated with *marked debility* out of all proportion to the intensity of the fever and the catarrhal symptoms.

The name *influenza* was given by the Italians, who believed the disease to be due to some influence of the stars.

What are the forms?

Simple, thoracic, abdominal, rheumatic. The organs of vision, of respiration, of circulation, of digestion, of innervation, as well as the subcutaneous tissues, may be involved.

What is the ætiology?

The cause of equine influenza has been one of the hidden mysteries and is still so, although the cocco-bacillus found by Ligniers in the exudate and in the blood is given as the cause.

Overwork, sudden changes of temperature, improper care and feeding, bad air, etc., are conditions which aid in the development

and growth of the specific germ. It travels in the air and seems to attack the animal suddenly.

The horse, donkey, mule, dog, as well as man, may become affected.

Give the pathology of influenza.

Lesions peculiar to this affection are not positive. The mucous membrane of the stomach, more especially the pyloric end, together with that of the small intestines, shows hyperæmia, is swollen and ecchymosed. The mucous membrane of the nasal cavity and the larynx is swollen and congested. In other cases the brain, spinal cord or spleen may show changes.

What are the clinical features of this disease?

The fever, the catarrh, and the symptoms referable to the nervous system. These conditions are independent of influenza, and are each due to the infecting principle. One of these may be more severe than the others; the fever is not the result of the catarrhal inflammation, nor are the symptoms of the nervous system the result of the other two.

The gastric mucous membrane may be congested, and in some cases that of the intestines; there is usually more or less extensive inflammation of the respiratory organs.

The bronchial glands are enlarged and softened; the right side of the heart contains pale but firm clots, the bronchial mucous membrane is reddened and œdematous. Hemorrhage into the eyes, lungs, and brain may take place.

What is the period of incubation?

It varies from about *twenty-four hours* to *six* or *seven days.*

Give some of the most important symptoms.

On account of influenza assuming numerous forms, the symptoms will vary accordingly. *This disease is remarkable for the variety of symptoms.*

Simple or *catarrhal influenza,* the most common form, comes on suddenly, in some cases preceded by a chill; there is loss of appetite, a cough, a congestion of the mucous membrane of the nose and eyes, which is swollen, reddened, and dry at the onset, causing sneezing or snorting, soon to become moist from the secretion, at first thin and watery, later becoming thicker and pus-like. From this redness and tumefaction of the mucous membrane of eye the disease has been called *pink-eye.* The eyes are half-closed,

the pupils contracted, photophobia, the sclerotic coat often yellow in color, extremities swollen, pitting on pressure, and are more or less painful, shown by the raising of the leg, especially if pressure be made with the fingers.

There is *marked debility* and *prostration*, shown by the staggering and cross-legged gait of the animal. In standing in the stall, the head is lowered (hangs his head), there is a depressed appearance, takes little if any notice, apparent headache, pulse quickened and soft, temperature elevated—104°, 105°, 106° F.—and remains high for five, six, or seven days and then lowers; the respirations are more or less accelerated.

At other times *the gastric* and *intestinal form* is present; there is congestion of the liver, shown by the yellowish or reddish color of the visible mucous membranes; also a sour odor to the breath, constipation, followed by diarrhœa, in some cases caused by catarrh of the mucous membrane of the small intestines; colicky pains are sometimes present.

At other times the *nervous system* becomes affected, spinal trouble arises, there being loss of power of the hind extremities, sometimes ending in complete paralysis.

What complications may arise?

Laryngitis is probably the most common.

Pneumonia, which usually assumes a low form, ending in gangrene.

Pleurisy, with effusion, which usually ends fatally.

Purpura hæmorrhagica is quite a common complication.

How may influenza be diagnosed?

By the suddenness of the attack, great prostration, the irregularity of the temperature, by the gait, the condition of the eyes.

At the onset it may be difficult to make a diagnosis in some cases, but soon the symptoms make the diagnosis easy.

What is the prognosis and the duration?

Simple uncomplicated cases recover in from seven to ten days or two weeks. *When complicated*, the prognosis becomes grave and varies according to the severity of the symptoms and the constitution of the animal. These cases may last two or three weeks or longer.

What is the treatment?

Expectant and *supporting treatments* are used.

The old line of treatment, bleeding and mercurials, are not to be used. Purgatives are usually contra-indicated. Laxatives may be used when required.

Stimulation is important; chloroform, ammonium carbonate, liquor ammonium acetatis, and the like are drugs indicated; alcohol or whiskey in drinking-water.

When the fever is high, quinine, antipyrin, antefebrin, acetanilid are usually of service.

Potassium nitrate and colchicum are indicated where the legs are swollen; these may be given in the feed.

For weak heart, digitalis, camphor, belladonna, hyoscyamus, spirits of turpentine, iron. Treat the complications according to indications.

THE LOCAL TREATMENT consists of hand-rubbing to the legs, anodyne liniments, the application of mustard possibly, bathing the eyes with salt solution, warmth to body.

RHINO-ADENITIS.

What are the synonyms?

Adenitis equorum, strangles, colt distemper, distemper.

Name the forms.

There are two forms, viz., *the regular,* or *benign form,* and the *irregular,* or *bastard strangles.*

Define colt distemper.

It is an acute, specific, febrile disease, probably contagious, and characterized by a catarrhal inflammation of the upper air passages and associated by the formation of abscesses in the intermaxillary space and in other parts of the body.

Give the ætiology.

This disease seems to be confined more or less to the equine race, and, as a rule, one attack gives immunity. It usually occurs in young animals, it being a disease of colthood or acclimatization.

It is placed among the germ diseases, and said to be produced by the streptococcus Equi or S. rhino-adenitis (S. coryzæ contagiosæ Equi). While streptococci are invariably present they are also found in other situations and conditions, as poll-evil, quittors, fistulous withers, etc.

What are the symptoms of the benign form?

The *period of incubation* varies from four to eight days.

There are certain premonitory symptoms, such as the ill condition of the animal, being dull, not feeding well, and the coat looks rough.

At first a nasal catarrh may present itself, the mucous membrane is swollen, and a muco-purulent or purulent discharge takes place.

In a day or so the glands of the intermaxillary space enlarge; the subcutaneous tissue is often involved, and frequently fills up the entire intermaxillary space. The swelling is hot and painful at first, and there is a tendency to pus-formation; the most projecting point softens, the hair falls off, the skin breaks or is opened by the veterinary surgeon, and pus escapes. After a few days the cavity remaining begins to heal by granulation and soon disappears. The above is about the usual course of this form of strangles, as far as the local symptoms are concerned.

Some of the general symptoms are, an elevation of temperature (103° to 105° F.), an increased pulse, more or less impairment of the appetite, especially if laryngitis or pharyngitis be present.

How is the diagnosis made?

By the age; usually a disease of colthood, although any age may be attacked. In city practice, the history that the horse is green often helps us, as well as the symptoms, making the diagnosis easy.

What disease may it be mistaken for?

Glanders, principally.

How is the differential diagnosis made?

In colt distemper the swelling is more or less smooth to the feel, is large, generally filling the intermaxillary space, is very painful, while in *glanders* the swelling is nodulated, there is a peculiar discharge, together with the ulcerations on the nasal mucous membrane.

What is the prognosis?

The prognosis, as a rule, is good, the affection lasting from ten days to three weeks, when recovery takes place.

What treatment is recommended?

The treatment, as a rule, is very simple, as the disease runs its regular course and we cannot abort it, so we assist nature and treat the symptoms as they arise.

Electuaries may be given when the laryngitis is severe. Inhalations can be used in some cases. Potassium nitrate in the

drinking-water is often beneficial, from its cooling properties as a drink. Potassium chlorate, from its refrigerant and specific actions.

If the lymphatic glands are much swollen and suppuration is taking place, hot poultices can be applied to hasten the process.

Blistering with cantharides, and, after a day or so, apply the hot poultices. Never be too hasty in opening these abscesses, but let them get good and ripe (as we say); when the hair falls off and the abscess points, make a crucial incision and allow the pus to escape, after which wash out thoroughly.

Astringent or even caustic and antiseptic solutions should in some cases be injected daily to keep the granulations in proper condition, trying to avoid sinuses being formed. When the cavity does not yield to the solution you are using, it is well to change and use some other drug or drugs. In the majority of cases, however, antiseptic solutions alone are necessary, as the granulations are usually neither exuberant nor unhealthy.

Define irregular strangles.

This form receives the name of *bastard* or *malignant strangles*, and is seen mostly in dealers' stables.

Abscesses form in different parts of the body, as the neck, in the groin, in the inguinal region, along the intestinal canal, in the thoracic cavity, and, in rare cases, in the brain.

What are the symptoms?

Vary according to the seat of the abscess. The local symptoms confined to the head show the glands to remain indolent, even with blistering and poulticing; the head commences to swell, the animal refuses food, the breathing becomes difficult, and the animal fades away. There is a bloody discharge from the head, a fœtid odor, and a tendency to develop a low form of pneumonia.

How is this form to be treated?

Steaming the animal's head, the use of electuaries, washing out the mouth with gargles, the giving of tonics, stimulants, and good food, according to indications.

Tracheotomy may be required where the dyspnœa is marked, due to the swollen condition of the head or of the throat; there is a liability in these cases, after an operation, to gangrene, so care should be exercised. Remove the tube every twenty-four hours,

clean it thoroughly, and rinse it in an antiseptic solution. Also cleanse the wound and then replace the tube.

VARIOLA.

What are the synonyms?

Small-pox.

Give the definition.

It is an acute, febrile, contagious, and systemic disease, characterized by *eruptions* on the skin and mucous membranes, which follow a definite course.

What animals may be affected?

This disease may be seen in the horse, sheep, pig, dog, goat, and ox.

How may the disease be divided for study?

Into three stages: 1, *The stage of incubation;* 2, *the stage of invasion,* and, 3, *the stage of eruption.*

Describe the stage of incubation.

This is the time elapsing from the entrance of the poison into the system and the first manifestation of the disease.

In the *horse* about one week, four to six days in the *cow,* four to seven days in the *sheep,* and from ten to fourteen days in *man.*

What takes place during the stage of invasion?

This is called the *initial stage,* and is usually ushered in by a chill, followed by symptoms of fever and catarrhal symptoms. This stage lasts from twenty-four to forty-eight hours.

Describe the stage of eruption.

This stage is *important* and *characteristic.* Little red spots make their appearance on the skin in various parts of the body; soon little nodules present themselves, which rapidly develop into vesicles filled with a clear, limpid fluid; these vesicles are peculiar, having a depression in the centre, and are called *umbilicated.*

In three or four days pustules take the places of the vesicles. The pus dries on top, forms a scab, which after a time falls off and leaves a cup-shaped cicatrix or pit.

HORSE-POX.

Give the synonym.

Variola equina.

What is the ætiology?

It is caused by a *specific organism*, which is fixed and volatile, and may be found in pustules, the scabs, the blood, the secretions, the excretions, and the expired air.

What are the symptoms?

There is fever, dulness of the animal, loss of appetite, associated with skin eruptions, which are generally seen in isolated parts of the body, as the lower parts of the extremities, around the nostrils and lips, and can be better appreciated in horses with light-colored skins.

The legs are hot, swollen, and painful, and often there is lameness; the swelling extends along the back part of the limb as high up as the hock.

On the white surfaces the *red spots* show themselves, then they become *pimples* or *nodules*, then *vesicles* form, later to become *pustules*, which dry and form *scabs*, soon to fall off and leave *cicatrices*.

What is the differential diagnosis?

This affection may be mistaken for *scratches*, unless a careful examination be made. Again, it may be mistaken for *glanders*, but by watching the symptoms, isolating for a few days, there will be no trouble in differentiating.

What is the prognosis?

If the symptoms be mild, the prognosis is good. The condition of the animal and the surroundings have a marked influence.

What can be done for these cases?

It being a *self-limited disease*, leave it alone and assist nature. Keep the parts clean, apply antiseptic dressings, and treat other symptoms as they arise. It is well to cover the eruptions with sweet-oil, vaseline, or sprinkle them with a powder, as bismuth subnitrate.

Cooling drinks, as potassium nitrate in the drinking-water. Sulphite of soda may be given in these cases.

Vaccination should be resorted to, not forgetting to isolate the patients.

GLANDERS.

What are the synonyms?

Equina, farcy.

Name the forms of glanders.

As regards the duration and intensity, three forms are recognized, viz.: *Chronic glanders, acute glanders,* and *latent glanders.*

Clinically, two forms are found, namely, *glanders proper* and *cutaneous glanders,* or *farcy.*

Define glanders.

It is a malignant, specific, and contagious disease, which attacks mostly the equidæ, and is characterized by constitutional as well as local symptoms of a grave character.

What is the ætiology?

It is due to a special germ called the *bacillus malleii,* or *bacillus of glanders,* discovered by the French and Germans. Debility, low feeding, overwork, bad stables, etc., put the animal in condition to develop the disease if exposed.

Describe briefly the micro-organisms.

They are little, rod-shaped bodies, about two-thirds the diameter of the red blood-cells, and have a peculiarity of living in a temperature of between 68° and 113° F.; at this temperature they will grow, and can be cultivated, but they require oxygen in which to live.

They can be killed by freezing, or, better, by boiling water or certain drugs, as the bichloride of mercury, 1-5000, or a one per cent. solution of permanganate of potash.

The favorite seat seems to be in the lymphatic system; the germs are not, as a rule, found in the bile or milk.

What are the modes of infection?

Some animals seem to have immunity; it can be inoculated into some of the equine species, and especially in the ass, which is more

susceptible than is the horse; other animals, as the goat, the guinea-pig, the rabbit, the dog, the sheep, the pig, are those which may be inoculated.

The bacilli are carried by means of *watering troughs,* harness, especially the bit, bedding, manure, curry combs, pails, stables, horseshoeing shops, boats, trains, etc., as well as by direct contact with the diseased animal.

CHRONIC GLANDERS.

What are the symptoms of chronic glanders?

Chronic glanders may come on insidiously or may be shown by constitutional symptoms, which gradually subside as the lesions present themselves.

This is the most common form, and is characterized by *ulceration* of the mucous membrane of the nasal cavity. At first there is a reddened spot, which soon becomes elevated, a pustule is formed, which ruptures and leaves an irregular-shaped ulcer, commonly called a *chancre*; the ulcer has everted edges, which are thickened, reddened, and form a ring around the ulcer.

The ulcers are apt to spread, becoming confluent, and in some cases perforating the septum; a favorite seat for these ulcers is in the false nostrils.

Another important symptom is the *swelling of the intermaxillary glands.* They have a characteristic feel, being indurated, adherent to the jawbone, bossolated, and are non-painful. The swelling is usually unilateral, although it may be bilateral. These glands show no tendency to suppurate in the majority of cases; some few may break down and discharge a thin, oily, sticky fluid.

The character of *the discharge* from the nostril should not be lost sight of; it is of a greenish-yellow color, sticky, at times bloody, is non-odorless, except when admixed with dead material, and often adhering to the external edges of the nostril.

Tell the general symptoms of chronic glanders.

The animals do not seem to do well; their appetite is variable, they lose flesh, staring coat, rise in temperature a degree or two, they sweat more readily, become fatigued, at times show shifting lameness, discharge from nose is bloody in some cases, cough, œdematous swellings may be present, and the mucous membranes are often of a slate color.

LATENT GLANDERS.

What is latent glanders?

This is a form of glanders that has no external lesions, they being entirely internal.

What is usually found on post mortem?

Nodules in the lungs, ulcerations on the bronchial mucous membrane, and also of the mucous membrane of the larynx.

Give some of the general symptoms.

The animal is dull, has a staring coat, a cough which is dry and hollow, the respirations are altered in character, lameness may be present. Dulness over these affected parts; more or less rise in temperature.

ACUTE GLANDERS.

Define acute glanders.

Acute glanders is the same as the other forms, except that the symptoms are more severe and the course more rapid.

What are the symptoms?

Hemorrhage from the nostrils is often the first symptom noticed; in other cases a discharge.

The period of incubation in acute glanders is from three to five days in inoculated cases, while in infected cases, weeks or months.

The mucous membrane of the nose shows spots or ulcers; there is a swelling of the intermaxillary glands which is painful on pressure and not limited; the temperature is elevated to 103°, 104°, or 105° F.; the respirations accelerated; there is a discharge from the nose which is sticky and often causes particles of dust, etc., to accumulate around the nostrils. Death may be caused by suffocation.

FARCY.

What is farcy?

Cutaneous glanders, or *farcy*, is another manifestation of the disease, and is characterized by swelling or nodules (called *farcy buds* or *farcy buttons*) of the skin and superficial lymphatic glands.

Describe these nodular swellings.

They vary in size from that of a pea to a hickory-nut, and may be found along the jugular groove, the inside of the thigh, as high

up as the base of the tail, along the back part of the hock, under the abdomen, on the sides of the neck and shoulder, on sides of the chest, where the saddle rests; also around the head, face, and lips.

In *acute cases*, about the sixth or seventh day, these break down and discharge a greenish-yellow material, which is oily and sticky. In *chronic cases* there is no tendency to suppurate, they being hard and non-painful.

How may glanders be diagnosed?

Principally by the *ulcers*, peculiar thin but oily *discharge*, *swellings* of the lymphatic glands, *elevation of temperature*, *emaciation*, and by the use of *mallein*.

What disease may glanders be mistaken for?

Nasal catarrh, pus in the guttural pouches, purpura hæmorrhagica, leucocythæmia, rhino-adenitis, urticaria, lymphangitis.

What prognosis should be given?

The prognosis is grave. *Report all cases to the Board of Health.*

Describe the mode of treatment.

Isolate all suspicious cases, and await development of symptoms. Give animal a full aloetic purge; water from a separate pail; be careful about the bedding, blankets, harness, etc. Scald stalls with washing soda (1½ pounds to each pail of boiling water); then use carbolic acid in water, or bichloride of mercury, and submit the building periodically to chlorine or sulphurous acid gas.

If not positive, use *mallein*; inject 2½ c.c. in the side of the neck, remembering to take the temperature before the injection. *Take temperature every two hours for at least fourteen hours*, and in some cases twenty-four hours. The features are, a *rise of temperature*, two or more degrees, and a *local swelling* at the point of inoculation, which is painful on pressure. *Never inject mallein* when the temperature is *above* 101° *F.*

Is mallein reliable?

While mallein is not infallible, yet it is useful and should be used at every opportunity in doubtful cases.

What can be said of the blood test in glanders?

The blood test has its usefulness although not absolutely reliable. Better results are obtained by getting a sample of blood, then using mallein and comparing the results of each.

If mallein fails to give a reaction, what causes such failure?

It is due either, to not being properly injected, the mallein not being good, cases being well advanced, temperature too high at time of injection, certain other conditions or diseases existing, also when the bacilli are not multiplying or acting on the system.

Does mallein have a curative action?

In some cases it appears to have somewhat of a curative action. At any rate the disease has been noticed to recede in some cases after its use.

MALADIE DU COIT.

What are the synonyms?

Dourine, equine syphilis, venereal disease, disease of coitus.

Define dourine.

This is a contagious venereal disease seen in stallions and mares, rather chronic in its course, and characterized by a *discharge* from the genital organs, associated with *ulceration*, and followed by *paralysis*.

What is the cause?

It is produced by Trympanosoma Equiperdum, which gets into the blood, semen, vaginal secretions, milk and erosions of the mucous membrane of the genital organs. It is a disease seen after copulation, and the vehicles of contagion are in the urethra of the male and the vagina of the female.

This disease was first noticed in 1796, and has since been seen in Poland, Germany, Austria, Switzerland, England, Belgium, and was imported into this country in 1880.

How long is the period of incubation?

It varies from *one* to *six* or *eight weeks*.

What are the symptoms seen in the female?

A few weeks after copulation a discharge from the vulva is noticed; it is clear at first, but soon becomes opaque, yellowish in color, and sometimes ichorous.

The genital organs become swollen, the mucous membrane thrown in folds and covered with a gelatinous-like fluid; red spots or erosions on the mucous membrane may also be present.

The inflamed condition of the clitoris causes the mare to stretch herself and eject small quantities of urine at varying intervals; the lips of the vulva open, the erect clitoris is shown, and there is switching of the tail.

On the body and legs are indolent swellings the size of a fifty-cent piece; these may disappear and reappear in other places. These swellings are said to be caused by an infiltration into the papillary layer of the derma.

The most serious symptom is the paralysis of the posterior extremities; the animals drag their toes, rock their bodies, and cross their legs somewhat similar to cases of spinal meningitis or influenza. This paralysis is apt to be progressive, causing a dropping of the ears, paralysis of the facial muscles, of the lips, eyelids, etc.; soon they go down, are unable to get up, get bed-sores, and die from emaciation, paralysis, or are destroyed.

Describe other symptoms seen in stallions.

They are more difficult to notice in the male. The discharge is usually less in quantity. There is swelling of the meatus, red spots or erosions over the sheath, which are often difficult to discern.

Then paralysis of the hind extremities is shown, and death is often preceded by symptoms of pneumonia. The lymphatic vessels and the inguinal ganglia are involved at times.

What are the conditions found on post mortem?

These are not pathognomonic; the body is emaciated, and where the tissues are cut through an anæmic condition is presented.

In some cases swelling, thickening, and exudation into the neurilemma, in posterior extremity, while in between the muscles a gelatinous material may be seen.

A congestion of the brain and spinal cord may be found, and some of the nerves show signs of degeneration. An œdematous condition of the vulva and neighboring parts may be present in the mare, while the penis, sheath, and scrotum in the stallion show like conditions.

Give the prognosis.

It is doubtful and grave. The course is irregular and chronic, lasting six or eight months to two or three years.

In the stallion it is more serious on account of liability of spreading the disease more rapidly. Seventy per cent. die.

Outline the treatment.

The indications for treatment point mostly to the parts affected; injections of astringent and disinfectant lotions—silver nitrate, 1-100; potassium permanganate, 1-100; bichloride of mercury, 1-10,000; zinc sulphate, 1 grain to the ounce; other drugs used are tannic acid (½ dram to 8 ounces), zinc choride (1 grain to 4 or 8 ounces rose water). Stimulating liniment over loins may be indicated. Castration has been recommended, but seems severe; destruction of the stallions has been ordered in some countries of Europe.

Internally, potassium iodide, Fowler's solution of arsenic, belladonna, strychnine.

These animals should be isolated.

SURRA.

What are the synonyms?

It is called Rot, Trypanosomosis, Relapsing Fever, Pernicious Anæmia.

Give the definition.

Surra is an acute specific infectious relapsing febrile disease of equines characterized by remittent fever, subcutaneous œdema, petechiæ, emaciation and debility.

What is the history?

This disease attacks horses, asses, mules, camels, dogs and rats and can be inoculated in rabbits, guinea pigs and other animals.

It is a disease, particularly of the horse, first known and described in India and has since been quite prevalent in parts of Asia and Africa. Surra has not reached the United States, but may, owing to its prevalence in the Philippines.

What is the ætiology?

It is produced by the presence in the blood of a flagellate protozoa called the *Trypanosoma Evansi.*

What is the period of incubation?

This period varies but is said to be about five to eight days, following inoculation.

How may the disease be spread?

By direct inoculation, by flies and other biting insects, by drinking stagnant and contaminated water, by contaminated pastures and by the excrements of animals.

Give the symptoms.

It is said to appear after rainy seasons. There is fever denoted by a rise of temperature (102°–104° F). The fever is more or less continuous with exacerbations and remissions which is typical of the disease.

There is an appearance of urticarial swellings on various parts of the body and petechial spots on the visible mucous membranes which are pale at first and later yellow. There is emaciation which is rapid, associated with great weakness and symptoms of pernicious anæmia.

As these paroxysms of attacks continue, the symptoms become more severe with each attack, the animal gets weaker, the temperature higher, the pulse more rapid and weaker, the respirations forty to sixty per minute, ulcers form on the mucous membranes, and the bowels, which were costive at first, later become loose.

When death approaches, the temperature rises, heart clots form, the stomach becomes perforated and the animal dies from heart failure, general debility or shock.

What is the pathology and lesions?

There is rapid destruction of the red blood cells by the organisms. The body is emaciated, the liver, spleen and lymphatics are enlarged. Petechial spots are found on the various internal organs, which are pale. Ulcerations are found in the stomach. The mucous membranes may have a yellowish cast. The œdema is of a yellowish jelly-like consistency.

How is surra diagnosed?

It is diagnosed by fever which is remittent, petechial spots on the visible mucous membranes, subcutaneous œdema, rapid emaciation and debility, together with the presence in the blood of the Trypanosoma Evansi.

What is the differential diagnosis?

Surra may be mistaken for anthrax, dourine, nagana, mal de caderas, but the symptoms and the finding of the special trypanosoma by the microscope will be sufficient to differentiate it.

If the trypanosoma evansi is not found by the first examination, daily examinations should be made until found. The remittent character of the disease makes it possible that the trypanosoma would not be found at every examination.

Outline the treatment.

There is no known treatment for the disease itself. Arsenic is said to stop the multiplication of the organisms. Iron, nux vomica and other tonics are indicated.

Preventative treatment should be our main object. Give pure water, do not use marshy contaminated pastures, or hay from such fields. Be careful about the excrements of rats getting into the food.

Keep the stables clean, screen the doors and the windows, spray the stables and even the animals with solutions of antiseptics to keep away or destroy the flies.

Do not remove infected animals to places where they might carry the disease to other animals, for they should be isolated.

Destroy diseased animals, bury deeply and cover the carcass with lime or other disinfectants.

NAGANA.

What is the synonym?

It is called the tsetse-fly disease.

Define nagana.

It is a specific infectious disease characterized by fever, œdema, rapid emaciation and anæmia.

Give the ætiology.

It is caused by the *Trypanosoma Brucei* which is transmitted from the diseased to the healthy animal by the tsetse-fly.

What is the period of incubation?

In the horse it is about four days.

What animals may be affected?

It attacks horses, asses, mules, cattle, dogs, camels, some wild animals, as the buffalo, hyena and antelope.

It may be inoculated into cats, rats, rabbits, guinea pigs, goats, sheep and monkeys.

The elephant, zebra, hen and pigeon are said to be immune.

What are the symptoms?

There is fever, the temperature (104°–105° F.) which lasts three or four days when it suddenly falls. Then it rises again and soon falls. The coat is rough, the hairs fall out, there is rapid loss of flesh although the appetite remains good. There is a tendency to diarrhœa. Œdematous swellings are present.

How is the diagnosis made?

Fever rising and falling, œdema, rapid emaciation even with the good appetite, symptoms of anæmia and the finding of the organism in the blood.

What is the differential diagnosis?

This disease may be mistaken for dourine, surra and mal de caderas.

Some investigators think that there is a possibility that the four diseases are the same, while others claim there is a difference. The lack of time for experimentation makes it difficult to draw any specific conclusions but the following may aid somewhat.

Dourine and mal de caderas cannot be transmitted to cattle; where mal de caderas exists cattle do not die of surra. In surra and nagana the same animals are attacked; the same course exists in the horse whether surra or nagana. Cows seldom live with nagana and rarely die of surra. Paralysis of the posterior extremity is an important symptom of mal de caderas. Dourine is marked by the form of the organism and the mode of infection.

What are the indications for treatment?

There is no known treatment except the preventative treatment given under surra.

MAL DE CADERAS.

Define this disease.

This is a specific infectious disease produced by the *trypanosoma equinum* and characterized by intermittent fever, emaciation, progressive paralysis of the posterior extremity and death.

What animals may be attacked?

It is a disease of the horse, mule and hog. It is transmitted to the dog, sheep, rabbit, rat and fowl. Cattle are said to be immune.

Insects are said to carry the organism producing the disease.

What are the symptoms?

The temperature elevates slowly, then suddenly falls to normal.

The animal is emaciated, œdema is usually present, the urine is high colored and often contains blood. Paralysis of the posterior parts which is progressive, interfering with the action of the kidneys and bowels.

The duration varies from two months to a year.

Give the morbid anatomy.

The spleen, liver and lymphatics are enlarged, the lungs contain ecchymotic spots, the heart muscle is soft and flabby. The thoracic and abdominal cavities contain a serofibrinous exudation. The muscles are pale and atrophied in the posterior extremities with hemorrhagic spots in some of these muscles. The muscular tissues are infiltrated with a serogelatinous material.

How is the diagnosis made?

Fever which is intermittent; emaciation, anæmia, paralysis of the posterior extremity and the finding of the parasite.

What is the treatment?

There is no treatment known to be of any value.

ACTINOMYCOSIS.

What are the synonyms?

Big jaw; lumpy jaw; commonly called by some "wolf in the jaw"; wooden tongue.

Define actinomycosis.

This is a chronic infective disorder, produced by *the actinomyces*, or *ray fungus*, characterized by local inflammation with the formation of neoplasms containing the microbe.

What is the ætiology?

This disease was first described by Bollinger, in 1887, when the proper nature of the disease was described in the ox, in which animal it most commonly occurs, being rare in the horse. This disease occurs in cattle, pigs, horses, and is seen in the human subject.

It is caused by *a parasite* that usually gains entrance with the food or drink, lodges on the mucous membrane of the buccal cavity, especially if abrasions exist.

What is the morbid anatomy?

In the early stages of its growth the parasite gives rise to small granulation tumors, not unlike those produced in tuberculosis; as they increase in size, proliferation of the surrounding connective tissue is extensive; soon suppuration takes place.

What are the clinical forms?

(a) *Alimentary form,* the mouth being the common location; but the parasite may locate in the intestines, producing ulceration.

(b) *Pulmonary form,* where the lungs are the seat.

(c) *Cutaneous form,* where associated with certain skin affections.

(d) *Cerebral form,* where the seat is in the cranial cavity and produces symptoms similar to tumor of the brain.

How may actinomycosis be diagnosed?

By the symptoms, by the local swellings followed by suppuration, and by the use of the microscope.

What treatment is recommended?

Hasten suppuration by poultices or hot fomentation, open the abscess and irrigate with astringent and disinfectant solutions.

Internally, potassium iodide has given the best results. Internal antiseptics may be indicated in some of the forms; bismuth, creosote, quinine, salol, etc.

EQUINE RABIES.

What are the synonyms?

Madness, equine madness.

What is rabies?

It may be defined to be an acute functional, contagious disease, occurring in the dog, cat, wolf, and fox, and transmitted to man and all animals by inoculation, and characterized by varying reflex and nervous symptoms.

Define hydrophobia.

This literally means, *dread of water.* There is an inability to swallow water, on account of a paralysis of the muscles about the throat.

What is the period of incubation of rabies?

In the horse it varies from *two* to *eight weeks; in the dog* it varies from *one week* to *six months; in the ox,* from two to four weeks; *in the sheep,* from three to six weeks; *in swine,* from three to seven weeks; *in man,* from two to nine weeks.

What are some of the symptoms shown in the horse?

The horse becomes nervous, excitable, and violent; it kicks and bites at the stall as well as itself or objects near by, or the groom, often causing fracture of the jaw.

The animal neighs, trembles, rubs against the sides of the stall; there is an impaired appetite, paralysis of the pharynx and of the posterior extremity, convulsions, coma, followed by death in from four to seven days.

What treatment is recommended?

Thoroughly cauterize the wound with acids, caustics, or the actual cautery, and treat antiseptically.

The Pasteur treatment is highly recommended, and should be used. This consists in inoculating the animal with a specially prepared serum.

DYSENTERY.

What is the synonym?

Bloody flux, catarrhal dysentery, diphtheritic dysentery, amœbic dysentery.

Define dysentery.

It may be defined to be a specific infectious inflammation of the large intestines, usually proceeding to ulceration, characterized by *frequent stools, colicky pains,* and *tenesmus.*

Give the ætiology.

This disease is not common in the horse, being more frequently seen in cattle.

It is more apt to occur in hot climates, but may be seen in any location.

Although probably of *specific origin,* this fact is hard to establish clinically in every case. One form is produced by amœba.

Animals kept in damp stables, low and marshy pastures, in localities where there is decomposition of vegetable or animal matter, the drinking of stagnant water, eating unwholesome food, the sudden chilling of the skin, stopping perspiration, together with indigestion, are among the predisposing causes.

Some *pathogenetic poison,* the nature of which is not understood, is probably the essential cause in other forms.

Dysentery in the human subject is one of the four greatest

epidemics of the world and one form is caused by bacillus dysentericæ.

What is the pathology?

The mucous membrane of the large bowels, and sometimes the ileum, becomes of a red-brown color, especially that of the colon, where the disease is most extensive.

The contents of the intestines are liquid, consisting of serosity, shreds of mucous membrane, and tenacious, blood-stained mucus.

There is congestion and infiltration of the mucous membrane, and little vesicles may be seen here and there, which rupture, leaving ulcers, which are characteristic of dysentery. These ulcerations dip down and may penetrate the muscular coat and affect the peritoneum.

Give the symptoms of dysentery.

It usually commences with symptoms of dyspepsia, the animal becoming dull, legs together under the body, back somewhat arched, diarrhœal discharges, loss of appetite, tongue furred and moist; later, glazed; thirst, which is prominent; abdomen swollen and painful.

The most important symptom is the *evacuation from the bowels,* which is at first liquid, fetid odor, and admixed with blood, and therefore called *bloody flux.* The discharges are very irritating to the mucous membrane, causing colicky pains and tenesmus. *Emaciation* takes place rapidly, the discharge becomes involuntary, and there are symptoms of asthenia; the animals die, generally, from exhaustion.

Give the prognosis.

The milder cases recover, while the cases with ulceration and bloody discharges usually die.

If the case be complicated the prognosis is grave.

What is the duration?

The average duration is from seven to ten days to four weeks.

Outline the treatment.

Try to get rid of the irritating material in the intestines by an oleaginous purge, which, however, should be used with care.

Morphine hypodermically is indispensable to relieve the pain and straining.

Large doses of bismuth (2 to 4 drams) every two or three hours are useful, being an internal antiseptic.

Very small doses of bichloride of mercury; other drugs indicated are ipecacuanha, chalk, tannic acid, copper, alum, zinc sulphate, lead acetate.

Locally, moist heat to the abdomen.

Injections of water, at the temperature of the body, containing astringents, relieve the straining. Silver nitrate (20 to 60 grains to the pint), injecting 2 to 4 quarts or more. Quinine (1-5000, or 1-2500, or 1-1000) may be used. Injections are not without danger, so care should be used. A cocaine suppository may be used before the injection, to overcome the straining.

The *diet* should be light, consisting of bran mashes, oatmeal gruel, etc.

CEREBRO-SPINAL MENINGITIS.

Give the synonym.

Cerebro-spinal fever.

What is the definition?

This is a specific infectious disease, occurring sporadically and in epizoötics, characterized by an inflammation of the cerebro-spinal meninges, and running an irregular course.

Give the ætiology.

It is due to *a germ.* Bad hygienic conditions, as damp, dark, ill-ventilated stables, excessive heat, overwork, mould from grain, hay, etc., probably assist in its development. Micrococci and various bacilli have been found. Prof. V. A. Moore obtained cultures of a colon bacillus from the brain in one outbreak and got negative results in another.

The Diplococcus intracellularis meningitis has been isolated and been constantly found present in man.

What is the morbid anatomy?

There may be *no characteristic* changes, as the majority die before exudation takes place. In well-marked cases the meninges of the brain and cord are inflamed, the blood-vessels standing out prominently, and the ventricles contain a serous exudate.

What are the symptoms?

It usually occurs as an *enzoötic disease*. The animals are apparently well at night, and in the morning one horse may be down, another dead, others refuse their food, they being unable to swallow on account of a paralysis of the throat, which condition can be verified by the introduction of the hand into the pharynx. In the course of several hours the paralysis may extend toward the posterior extremity, causing a peculiar swaying motion, with a dragging of the toe of the extremity. The tail is limp, it having lost its power. These cases usually terminate rapidly, the average duration being eighteen hours. The pulse, temperature, and respiration are not of any particular use in making a diagnosis.

How is the disease diagnosed?

It may be *diagnosed* by the suddenness of the attack, by the inability to swallow, from paralysis of that part, which usually extends toward the posterior extremity.

What is the prognosis?

Cerebro-spinal meningitis is usually fatal.

Outline the treatment.

This affection does not seem to yield to treatment. Belladonna, ergot, quinine, calabar bean, potassium bromide, morphine (hypodermically), iodide of potassium, are drugs used. *Locally*, ice or cold applications to the head.

SEPTICÆMIA.

What is septicæmia?

Septicæmia comes from *septico*, signifying "putrefaction," and *hæmia*, "blood."

It is a constitutional disease due to the absorption into the blood of decomposed dead matter from a wound; or it is a putrid infection of the blood, associated with certain constitutional symptoms and caused by bacteria.

Healthy blood will destroy bacteria if they are in small quantities, but if in large quantities they poison the blood.

What is the causation?

Ptomains and toxins will cause it; also microbes given under pyæmia.

What are the symptoms?

These vary with the amount of septic material present. There is a slight chill, followed by fever, with a rapid rise of temperature, being as high as 105° or 106°; there is dulness of the special senses, and prostration; the skin is hot and dry, there being hardly any perspiration; the secretions and excretions are often tinged with blood; the urine contains a large amount of urates; the mucous membranes are of a dirty yellowish color and ecchymosed.

The pulse is small, weak, and quick, the respirations are feeble and difficult, and there is bloody diarrhœa in the majority of cases. The lymphatic glands become swollen all over the body, and it is through this channel that the septic material gets into the circulation.

How is septicæmia diagnosed?

From the fact that these symptoms appear in animals where we expect to see this condition, following gangrenous wounds and the like.

What is the prognosis?

If the symptoms are severe and the constitution of the animal is weak, the *prognosis* is grave; in the milder forms the prognosis is more favorable.

What is the morbid anatomy?

The blood is darker than normal; it coagulates less readily, and contains pus microbes. The spleen is enlarged and softer; the lymphatic glands show signs of inflammation; the various viscera are somewhat swollen; mucous membranes of the stomach and bowels are often inflamed. Capillaries are inflamed, and hemorrhages often take place in the skin and mucous membranes, in the shape of ecchymotic spots.

What is the treatment?

The local treatment consists in the removal of the cause, if possible; the using of antiseptics in those putrid wounds, also removing those parts of the wound that are gangrenous, remembering to keep the wound open.

The constitutional treatment consists in good hygienic conditions, good nourishing food, good air, etc.; internal antiseptics, dilute acids, lime-water, stimulants (as whiskey), quinine, bromine, strychnine, salicylic acid.

PYÆMIA.

Define pyæmia.

It is a systemic disturbance, due to the absorption of septic matter from a wound, and characterized by the formation of multiple foci of suppurative inflammation (metastatic abscesses), in various parts of the body, and accompanied by certain systemic symptoms.

What is the ætiology?

It is caused by *pus microbes*, just the same as septicæmia, but they seem to be in groups and become lodged in various organs, and set up foci of suppurative inflammation, and reproduce in greater numbers.

The microbes producing pyæmia are several. The most common is the staphylococcus pyogenes aureus or albus; the streptococcus pyogenes; bacillus pyocyaneus; bacterium coli commune, and no doubt any pus-producing microbe.

What is the morbid anatomy?

The blood is characterized by a tendency to coagulate spontaneously (wherever the blood-current is slow). *Multitudes of micrococci* are found in the blood and on the walls of the vessels; *venous thrombosis* and *embolism* are essential features of this disease.

These emboli become lodged in the small arteries of different organs, and lead to the formation of abscesses. Metastatic abscesses are found in the lungs, liver, spleen, muscles, kidneys, heart, and brain.

In a general way we may say that the blood becomes directly affected by the veins, whereas, in septicæmia, it comes indirectly through the lymphatics.

What are the symptoms?

Well-marked symptoms are shown; first, a chill, followed by fever, with a gradual rise of temperature from 102° to 104° F. The chills of pyæmia occur irregularly, and the temperature is higher than in the sweating stage.

The pulse is frequent, small, and intermittent. The conjunctiva becomes yellow, there is loss of appetite, thirst, diarrhœa, the animal becomes dull, the respirations are hurried and shallow.

As death approaches, signs of delirium show themselves, the pulse becomes more feeble and intermittent, and the animal passes into coma and death.

What is the differential diagnosis between septicæmia and pyæmia?

Septicæmia shows a slight chill, while *pyæmia* a distinct chill; *septicæmia* only one chill at the beginning, while in *pyæmia* the chills recur. In *septicæmia* there are slight, if any, sweatings, whereas in *pyæmia* there are profuse sweats; in *septicæmia* the temperature is high at the onset—105° or 106° F., while in *pyæmia* the temperature gradually rises—from 102° to 104° F. *Septicæmia* develops rapidly; *pyæmia*, slowly. In *pyæmia* the heart impulse is less forcible than in *septicæmia*. Finally, thrombi and multiple abscesses develop in *pyæmia* and are its distinguishing objective evidence, while they never occur in simple *septicæmia*.

What is the prognosis?

Always unfavorable.

What is the treatment?

There is the *preventative treatment* and the *treatment of a developed case*. The first resolves itself into cleanliness, good ventilation, sunlight, etc.

The pyæmic poison is eliminated by the intestinal tract, and not by the skin or kidneys. Internal antiseptics are used; bromine, carbolic and salicylic acids; the oil of turpentine, the sulphites and the hypo-sulphites of sodium, calcium, and magnesium; quinine is a drug most extensively used for its antiseptic, its stimulant and antipyretic powers. The patient should be supported by good nourishment and stimulants.

TETANUS.

Give the synonym.

Lockjaw.

Define lockjaw.

This is a functional infectious disease, characterized by tonic spasms of the muscles, with marked exacerbations.

Give the ætiology.

The virus is produced by *a bacillus* which occurs in the earth, in putrefying fluids, and in manure.

Some cases occur without any apparent wound, and these cases have received the name of *idiopathic tetanus.*

In other cases it may follow wounds, especially punctured wounds of the feet, where the plantar cushion is involved; those wounds that seem trifling are more apt to be followed by tetanus (called *traumatic tetanus*); also, where foreign bodies become lodged, such as small splinters of wood.

It may follow castration or other operations, as docking the tail; also, fracture of the vertebræ; or it may follow small wounds or abrasions from the harness.

The tetanus bacillus can be isolated and cultivated, it growing at the ordinary temperatures.

It consists of a slender rod with rounded ends, and may grow into long threads, and is anaërobic.

The bacilli develop at the site of the wound.

What is the morbid anatomy?

There are no characteristic lesions found in the brain or in the spinal cord. Congestions occur in different portions of the nervous system.

What is the semiology?

Usually ten days after a wound the symptoms may show themselves, there being slight stiffness of certain muscles of the neck, and possibly some difficulty in mastication.

The rule is that the symptoms come on suddenly; the man goes to feed the horse in the morning and finds he will not eat, and that he seems stiff.

The head is extended, the nose in the air, the tail slightly elevated and carried to one side, the hind legs more or less stiffened and wide apart (*a straddling gait*), and in severe cases the anterior extremities are separated. In moving, the body is not flexed, the animal moving as though he was made of one piece.

There is difficulty in backing, the horse appears nervous, excitable, and when you move him around quickly or elevate the head the membrana nictitans is thrown over the eye.

Trismus is often present, the teeth become set, and you cannot introduce your finger or even a blade of a knife between them

(hence it is called *lock-jaw*). In mild cases this symptom is not pronounced.

In the severe form there is a discharge of saliva; the voluntary muscles are hard to the feel, especially those of the neck.

The pulse, in mild cases, is not much altered, but in severe cases there is an increase in the frequency.

The temperature is peculiar; this is a non-febrile disease, but it often has a high temperature—105° or 106° F., and just before death it runs up to 100° or 112° F., or in some cases just after death.

How is the diagnosis made?

There ought not to be any trouble in making a diagnosis. When you have seen one of these cases, you have seen all.

The position of the body, the tail, and the manner of locomotion, and the membrana nictitans being thrown over the eye on the slightest movement.

In the human subject there are certain positions of the patient.

The ordinary position in man is where he rests on his occiput and heels, the back being curved. This position is known as *opisthotonos.*

The entire trunk and limbs may be perfectly rigid—*orthotonos.* Where the body is bent to one side it is called *pleurosthotonos.* When the back is arched and the body bent forward—*emprosthotonos.*

What is the duration and the prognosis?

This disease may kill quickly, in several hours or four or five days, or in other cases it may run three or four weeks, and you think they ought to get well, when they become exhausted, fall down, and, by some excitement, death results.

The appearance of the animal, anxious expression, eyes drawn in their sockets, nostrils dilated, furrowing of the skin of the face, saliva from the mouth, inability to open the jaw, body covered with perspiration.

A little noise, etc., throws them into spasms, and, if down, as a rule, they never rise again, and it is almost impossible to help them up.

Death is apt to occur during the paroxysm from heart-failure or asphyxia, or it may be due to exhaustion.

The average duration is from four days to six weeks.

Severe cases die and mild cases get well, in the majority of instances. *The prognosis* should, however, always be guarded.

What treatment is recommended?

There is no specific treatment as yet, and the various methods used have proved unsuccessful in the majority of cases.

The drugs used are opium in large doses, aconite, chloral hydrate, bromide of potassium, calabar bean, Indian hemp, belladonna, curara, alcoholic stimulants in excess, chloroform, ether.

Bloodletting and counter-irritation have been employed, but should not be recommended.

Do not excite the patient; it is often claimed that the less you do, the better; if in the country, it is often well to turn the animal out and leave him alone.

In the city we put the animal in a dark box-stall and keep him quiet; keep the people away, and have one person to care for him, with the orders that the attendant do everything quietly, so as not to excite the animal. The attendant should move around easily, making no sudden motion.

Do not give solid medicines, as a rule; the medicine should be given in liquid form and concentrated, and given with a syringe.

Suppositories may be used in some cases, composed of morphine and atropine, one-half or one grain each, used twice a day.

These are often good, and do not produce any irritation, as do medicines given by the mouth.

The laity say a sudden shock will cure tetanus, as throwing the animal overboard, or shooting off a gun over his head, or throwing water on him; also sudden blows. Others say that by placing sheepskin over the loins, letting it remain there until it rots, will cure these cases, but all these are whims, and should not be recommended.

The sheet anchor is to keep the animal quiet; the use of suppositories or hypodermics or liquid medicine, by the mouth, in concentrated form, and in some cases the inhalation of chloroform or ether.

Also, feeding the animal per rectum in some cases, or by having gruel in a pail, and when the animal is left alone he will often suck it up.

Tetanine (anti-toxine) has been used with varying success, but up to the time of writing it cannot be relied on. Probably in the near future it may be improved so as to produce the desired effect.

IV. CONSTITUTIONAL DISEASES.

PURPURA HÆMORRHAGICA.

Name the synonyms.

Purpura, petechial fever of horses, dropsy, anasarca, morbus maculosus, scarlatina.

Define Purpura.

This is a constitutional disease, having its origin in the blood and capillaries, and characterized by *petechial spots* on the mucous membranes, and by *swellings under the skin*, the result of sanguineous effusion.

What is the pathology?

Extravasations of the blood from the vessels are found in the interstices of the various organs, as the lungs, spleen, kidneys, and the subcutaneous tissue; there is a jelly-like mass, and the blood is darker than normal and more fluid.

Similar conditions exist on the skin and mucous membranes, associated with hemorrhage on the free surface.

Give the ætiology of this affection.

It may occur as a primary disease, but is seen mostly as a secondary condition.

The real cause is not well understood, and, although probably due to bacteria, producing toxins, one fact is obvious—that it follows debilitating conditions, as influenza, strangles, pharyngitis, intestinal catarrh, suppurative lymphangitis, pneumonia, pleurisy. Many cases, however, make their appearance without previous sickness.

The variety of bacteria found are many and varied so that no positive conclusion has as yet been drawn.

Embolism and thrombosis are said to be causes; also, a disordered condition of the vasomotor system. Bad drainage, dark, damp stables, poorly ventilated, seem to favor its development.

What are the symptoms?

In primary cases the symptoms come on suddenly; there is an impaired appetite, possibly a tendency to diarrhœa, some fever, and the animal dull and has somewhat of a stiffened gait.

In secondary cases we usually find the following: As the pneumonia, influenza, etc., subsides, convalescence is prolonged, swellings appear under the abdomen or on the legs, together with petechial or ecchymotic spots on the mucous membranes.

Swellings on the skin in various parts of the body make their appearance, usually in the most dependent parts—under the abdomen, between the fore-legs, along the thighs, around the nose. These swellings are large or small, more or less painful, tense, hot, and not of any uniform shape at first.

As the disease progresses these swellings either disappear or coalesce and become uniform, reaching from the foot up to the stifle in the posterior extremity, and up to the shoulder in the anterior extremity; when the head is the seat, the swelling extends as high as the eyes. There is one peculiarity about the ending of these swellings—that is, they end abruptly, as though a cord had been tied around the part. Often the swellings take place in circumscribed spots over the body resembling urticaria.

The swelling of the legs causes lameness, a stiffened or jerky motion. The animal does not care to move, the skin often cracks open, becomes bloody.

The general functions of the body are not particularly altered in the beginning, but, as the disease goes on, several functions are interfered with, notably that of prehension.

The temperature is not much raised at the onset, but later it may rise, in which case it usually denotes a complication.

The pulse is not very rapid at first, but later it often becomes accelerated, and possibly double.

The respirations are labored, especially when the head is swollen, the ribs becoming prominent during the act of breathing.

As the disease goes on, the swellings increase in size, the head resembles that of a hippopotamus, is heavy, causing the animal to rest it on the manger, the extremities become larger, the penis and sheath being so much swollen as to interfere with urination and locomotion.

The above condition may be noted in the afternoon, and the following day the swellings may have disappeared and their disappearance may be thought favorable, but these cases often die in the course of a few days, either from apnœa, œdema of the glottis or lungs, from gangrene of the lungs, or internal hemorrhage.

What is the duration of purpura?

The course and duration are very irregular, lasting from one to three or four weeks.

How may this affection be diagnosed?

The diagnosis ought to be easily made; *the petechial spots* on the visible mucous membranes, *the characteristic swellings,* which end abruptly.

What diseases may be mistaken for purpura?

It may be mistaken for *glanders proper,* or *farcy,* but there should not be any trouble in differentiating, as purpura shows petechial spots, and the swellings end abruptly.

Give the prognosis.

This depends on *the state of the animal, the place,* and *the time of year.* Never be positive, as mild cases may die and severe cases recover.

If the weather be cool, the animal able to eat and in a roomy, well-ventilated box-stall, the prognosis is more favorable.

If in hot weather, the animal unable to eat, the skin cracks, and sloughing takes place, the prognosis becomes very unfavorable.

About sixty to seventy per cent. die.

Outline the treatment of purpura.

General as well as local treatment has to be employed in many cases.

The *general treatment* should be directed toward improving the condition of the blood as well as the blood-vessels. Good hygienic surroundings are of the utmost importance, as well as looking after the diet.

The drugs indicated and recommended are alcohol, potassium chlorate, ergot, digitalis, potassium iodide, iron preparations, turpentine, potassium nitrate, strychnine, camphor, gallic acid, dilute sulphuric acid, salicylic acid, colchicum.

Professor James L. Robertson recommends strong coffee, one pint, potassium iodide, one or two drams, given three times a day.

Potassium nitrate may be given in food or drinking-water.

In some cases, especially where the head is much swollen, I use the fluid extract of nux vomica, thirty minims; the spirits of turpentine, fifteen to thirty drops; alcohol, one ounce—given as a dose every three hours with a syringe.

Colchicum powder or fluid extract is an important drug in these cases.

The *local treatment* consists of massage, rubbing and moulding the swellings with cold water, stimulating liniments, or hot water.

Try to prevent suffocation by attention to the swellings; keep nostrils open, or perform tracheotomy.

Do not cut these swellings, as gangrene is apt to follow. If wounds are present, treat them antiseptically.

The sero-therapeutical treatment is now being used and good results are being reported.

HÆMOPHILIA.

What are the synonyms?

Hemorrhagic diathesis, bleeder's disease.

What is understood by this affection?

It is a congenital condition, in which bleeding takes place habitually.

Give the ætiology.

There is a hereditary predisposition in these cases, as a rule. Pregnancy may have a tendency to develop it. Then there is the neurotic theory, as it is seen or associated with nervous disorders.

What are the symptoms?

Certain prodromic symptoms, as plethora, congestion, etc., may exist.

Bleeding takes place from the mucous membranes of the nose, mouth, lungs, stomach, intestines, or genito-urinary passages.

Traumatic injuries of various sorts produce the bleeding, which is difficult to arrest.

In man, after tooth extraction; slight wounds of any sort produce the hemorrhage.

How is this condition diagnosed?

By the presence of the hemorrhage and the history showing this tendency. This is rare in the horse.

Give the prognosis.

The *prognosis* is grave in these cases, as death usually results. Life may be prolonged in some cases for an indefinite period.

Outline the treatment.

It is symptomatic. The tincture of the chloride of iron, potassium chlorate, fluid extract of hydrastic canadensis, calcium chloride, ergot, mineral acids are drugs indicated.

Neurotic medicines are often beneficial, and may be the only means of stopping the hemorrhage.

Mechanical means are used where they can be applied.

Pads wet in a fresh infusion of the thymus gland may be used; or the application of fresh blood from a healthy animal may be of service.

OSTEOMALACIA.

Name the synonym.

Cachexia ossifraga.

Define this disease.

It is a systemic condition, with a diminution in the amount of calcareous salts in the bones of the adult, characterized by *softening and deformity of the bone* from reabsorption of these salts.

What are the post-mortem appearances?

This disease was described by Roloff in 1856, when the disease became epizoötic in Germany.

An early examination of the bones shows the marrow congested, while the remaining portion of the bone appears about normal. The little canals are enlarged, and there is more blood in the vessels.

As the disease progresses, the medullary cavities become filled up, the presence of which is recognized by little red spots in the marrow.

On the inner surface, little scales of bone are seen, which soon become absorbed. The bone becomes more brittle, friable, and the walls thinner, on account of the absorption of the lime salts, and are very prone to fracture.

A section of bone, when seen under the microscope, shows an absence of the salts.

Give the ætiology of osteomalacia.

This disease is rarely seen in the equine race, being more commonly met with among bovines.

It is seen among animals in zoölogical gardens, and more especially among pregnant animals and those giving milk. The more abundant the lacteal secretion, the more rapid the course.

It is a disease of *adult life,* and may be due to a lack of the proper amount of salts in the food. It may be seen during dry seasons, when the ground is dry, there not being sufficient moisture to dissolve the salts. The want of lime salts in the soil; such as swampy, turfy, or sandy soils, poor in phosphoric acid.

Three theories have been advanced:

1st. Where the animals do not receive these elements in their food.

2d. The acid theory, which says that lactic acid is formed in the stomach and dissolves the salts.

3d. The inflammatory theory—that an inflammation of the periosteum and bone substance takes place.

The first is probably the best, as the disease can be produced artifically by giving food not containing these salts.

The action of bacteria has also been suggested.

What are the symptoms?

The first symptom noticed is called *pica* (hunger, depraved appetite). These animals eat foreign bodies, such as sticks, straw, etc.; they lick the attendant's clothes, or they lick the walls, especially if they have been whitewashed.

If the disease is allowed to go on, there is trouble in locomotion; the animal is stiff, and in walking the legs become more or less entangled by the animal crossing them, and a cracking and snapping of the joints is often heard. Percussion over the bones gives a clear and hollow sound.

The articulations are hot, swollen, and painful; the animal does not stand still, but is constantly moving.

These animals seem to prefer lying down, and it is often difficult for them to get up, evincing pain when they do. Efforts at micturition and defecation cause pain.

At first there is no fever, but later there is often a slight rise in temperature, the pulse becomes increased, and emaciation is well marked.

The ligaments binding the joints may become loosened from their attachments or may become absorbed, and dislocation or

fracture of the bones of the hind extremity or of the pelvis is the result. The pelvis is apt to break down when the fœtus is present. Fracture of ribs may take place.

What is the prognosis?

The prognosis is favorable if seen early and the proper kind of food is given. If the disease is allowed to go on, the animal dies of asthenia.

Roloff says that these fractures get well by the formation of a callous, while others say a union rarely takes place; false joints are formed.

The fractures in these instances are painless.

What is the treatment?

Remove the cause, which is, in many cases, the lack of proper food; in these instances it is well to change the pasture and supply those articles that are wanting.

Give ground phosphates (bone dust), one or two ounces two or three times a day, and along with this a little common salt.

Stop the milking and allow the animal to dry up. If a valuable one, give linseed oil, or, better, cod-liver oil, either of these having a tendency to fatten and act as a tonic. I prefer giving carron oil, which consists of equal parts of linseed oil and lime water. Of this mixture two or four ounces may be given in the feed. The linseed oil may be substituted by cod-liver oil.

Give nitrogenous food, rich in calcareous salts, grains in the shape of oats or dry clover; fruit is also very beneficial.

Oil-cake prepared with the food may be used. Then, again, the preparations of iron, iodine. Stomachics to aid digestion and keep up appetite.

RICKETS.

Name the synonyms.

Rachitis, bone softening.

Define Rachitis.

This is a general or constitutional disease, affecting nutrition, and characterized by a *lack of calcareous salts* in the bone, producing alteration in their growth and shape.

What is the ætiology?

This is a *disease of youth,* and the animal may be born with

it or it may become developed very shortly after birth; the salts have not been deposited.

Rickets is met with in young foals, high-bred dogs, in calves, lambs, pigs, and among wild animals born in confinement.

It may be caused by improper nourishment while *in utero*, or after birth where only allowed to suck once or twice a day, or where the food does not contain the necessary variety and quantity of the proximate principles. Infection has been set forth by some.

What is the morbid anatomy?

This is not a local disease of the bones of the extremities, as many imagine, but may and does affect all the bones of the body, as well as other tissues.

The bones show the most important changes, especially the long bones at their extremities.

There is an irregularity of the line of ossification, which is more spongy and vascular. The periosteum, which is thickened, strips off and displays a spongoid tissue. These changes cause a delay of ossification, so that the bones are not so firm and do not grow so rapidly. Chemically, the calcareous salts show a diminution, in some cases of twenty-five to thirty-five per cent.

The spleen and liver enlarge.

What are the symptoms?

The bones are soft, the articulations swollen, which causes them to change their shape wherever pressure is brought to bear; the bones of the extremities bend under the weight of the body, giving the names of *bow-legged*, *knock-kneed*, *cow-hocked*, *pigeon-toed*, according to the location of the condition.

The pelvis often becomes narrow, the spine twisted or curved. If it curves downward it is called *lordosis*, or *saddle-back;* if curved upward, *kyphosis*, *carp-back*, or *roach-back;* if side-curving, *scoliosis*. The breast-bone may become prominent, when it receives the name of *chicken-breasted*. The ribs bulge out, and enlargements are seen at the junction of the false and true ribs; the abdomen is thus prominent, the name of *pot-gut* being given to this condition.

There is an impaired appetite and digestion, slight fever, pain on motion or pressure, inability to walk in some cases, emaciation, delayed dentition, the teeth being irregular, muscles are soft and weak, mucous membranes pale, flatulency, diarrhœa in some cases, and at times nervous symptoms appear, the animal being uneasy.

What is the prognosis?

The disease itself is not fatal, as a rule, but is apt to produce an unsound animal or leave the animal in such condition as to render it liable to other affections. Complications may arise which may make the prognosis grave.

Deformities may result, varying in extent, which may or may not interfere with the usefulness of the animal.

Outline the treatment.

A laxative or purgative is usually required at the onset, to rid the alimentary canal of the undigested material which is usually present; in these cases linseed oil combined with sodium or potassium bicarbonate, in the form of an emulsion, can be employed.

Then cod-liver oil with preparations of iron or lime-water, given three times a day if the stomach does not rebel.

A drachm or so of prepared bone-dust given in the food.

Quinine in tonic doses is often useful. Fowler's solution of arsenic, nux vomica, pepsin, pancreatin, etc., may be used in cases indicated.

Pure air, exercise, and good food are important. The food should consist of the mother's milk, if possible. In other cases, cows' milk, to which lime has been added to aid its digestion.

To prevent this disease, feed pregnant animals properly, and in this way lessen or prevent the disease.

If there is any deformity, it should be corrected by the use of padded splints; the inflamed parts that are painful can be bathed with anodyne liniments, after which stimulating liniments are of service.

OSTEOPOROSIS.

Name the synonyms.

Big-head; eccentric atrophy of bone.

Give the definition.

This is a porous condition of the bone, characterized by an enlargement of them due to a dilatation of the Haversian canals, with atrophy or absorption of the compact bony substance.

What is the causation?

This is very common among the equines in certain districts, and may be seen among high-bred horses as well as common-bred work horses.

There are certain districts or regions of this country, as Long Island, New Jersey, Ohio, and Illinois, where this disease is quite common. It does not seem to affect the Yankee horses, as a rule.

The climate and the soil have something to do with it; there is absence of some of the salts. There may be an absence of something in the soil or in the feed which has to do with the formation of bone.

It is possible that this disease may be of germ origin, as in some respects it resembles diseases of this sort.

What is the morbid anatomy?

The vascular and fibrous tissues become increased without any increase of bone.

The contents of the cells and the cavities become abnormally developed, the bones thickened, especially those of the lower jaw. The bones of the extremities and the articulations are often enlarged. In some cases ulceration of the cartilage may be present.

The bones of the animal are brittle and very prone to fracture; if the animal were pulling a big truck and should fall, there is a liability to fracture, especially of the ilium; it is often necessary to differentiate this condition from other troubles.

Give the symptoms.

These are somewhat characteristic.

We usually get a history—that the animal is a poor feeder; at first they were good feeders, were in good condition, but they began to fall away and did not eat well. They have a peculiar tucked-up appearance of the abdomen.

If you make them trot, they travel with the so-called short dog-trot gait; there is no knee action, the front legs are stiff and straight, and they often look as though they were going fast, but they are not.

The transverse diameter of the lower jaw is increased; ordinarily it may be, say, half an inch or so, while in this disease it may be three or four inches. Pressure on the diseased bones causes pain.

Very often, in young animals, the roots of the molar teeth give prominence to the face, and we should be careful not to mistake the two. In Shetland ponies it is often difficult to diagnose, as the bones of the face are naturally prominent.

Another symptom is lameness, which is very well marked in some cases, but is hard to localize. Generally, the articulation, as the shoulder-joint and the hip-joint, may be involved. Lameness is apt to shift. We often call it rheumatic lameness, as it has a tendency to shift; sometimes it may be due to traction by the muscular and tendinous attachments. The articulations may be diseased, or the ends of the bones under the cartilage, and when in this condition are very liable to fracture. These animals are often down and unable to get up.

How is the diagnosis made?

When a horse is brought to you lame, in a hind or front leg, and you look him over and cannot locate the lameness, examine for osteoporosis.

The patient, as a rule, is not fleshy, is tucked up; the bones of the jaw are increased in diameter—both the lower and the upper jaw.

These animals are usually poor feeders and are apt to have a shifting lameness, travelling from one leg to another.

Give the prognosis.

This depends on the age of the animal and the extent of the disease.

The milder cases in young animals may be benefited and in some cases entirely relieved.

In other cases the prognosis is grave, and, as a rule, the animals are best destroyed.

Outline the treatment.

There does not seem to be any medicine that has any particular effect.

We say, turn him over to the green doctor—turn him out to grass on soil containing lime salts.

Sometimes give a physic, followed by cod-liver oil with calcium phosphate, and give other drugs that may be indicated.

In cases where the jaws are very sore, ground oats may be given.

Locally, anodyne and stimulating liniments are of service.

DIABETES.

What are the forms?

There are two forms—diabetes mellitus and diabetes insipidus.

DIABETES MELLITUS.

Give the synonym.

Glycosuria.

Define this form.

This is a constitutional *disorder of nutrition* in which sugar accumulates in the blood and is excreted through the urine, the daily amount of which is greatly increased.

What is the ætiology?

Too much food, especially carbo-hydrates and peptones, with little exercise; also, changes in liver functions, pregnancy, faulty metabolism, certain poisons or pathogenetic organisms.

Briefly state what is known of the morbid anatomy.

Comparatively very little is known of the morbid anatomy. The liver is enlarged and fatty, the pancreas smaller, the kidneys show nephritis and are fatty, the blood contains sugar.

Give the symptoms.

They usually show themselves more or less slowly; there is loss of strength, alterations of digestion, increased thirst, which is very noticeable, passage of large quantities of urine containing sugar; exertion causes fatigue, and there is a marked and progressive emaciation, although the appetite is ravenous. The skin is dry and harsh, constipation apt to be present, the tongue dry, the saliva being scanty.

The urine has a *high specific gravity*, is pale in color, almost like water, has a sweetish odor and a sweetish taste.

To test the urine for sugar, use any of the following tests: Fehling's, Trommer's, or fermentation test.

Give the prognosis.

Recovery is rare. Cases may be temporarily relieved.

What treatment is recommended?

Good grooming and attention to the diet are important. Avoid food containing sugar.

Drugs indicated are opium, codeia, potassium bromide, arsenic, salicylates, lithium salts, strychnine, creasote, lactic acid, nitroglycerine, sulphide of calcium, bromide of arsenic, etc.

DIABETES INSIPIDUS.

What are the synonyms?

Polyuria, chronic diuresis.

Give the definition.

This is a chronic affection, characterized by thirst, emaciation, and the passage of large quantities of pale urine, which has a low specific gravity.

What are the causes?

They are not well understood; traumatic injuries, especially to the nervous system, tumors of the brain, aneurisms; some nervous irritation affecting the medulla, either directly or indirectly.

Give the symptoms.

The disease usually comes on slowly; the first symptoms noticed are the passage of large quantities of urine and an increased thirst. The urine has a low specific gravity, is watery and very pale; the appetite is good, but not increased; the mouth and skin are dry, but the animals seem well nourished.

How is diabetes insipidus diagnosed?

By the passage of large quantities of urine of a *low specific gravity*, not containing sugar, except, possibly, in small quantities; also by the increased thirst, the body being fairly well nourished, emaciation not marked. These symptoms point out the distinction between the two forms of diabetes.

What is the treatment?

Nothing seems to give satisfaction. The following are among the drugs recommended: Ergot, valerian, gallic acid, mineral acids, antipyrin, arsenic, turpentine, strychnine, potassium iodide, bromides, salicylates, etc.

SECTION IV.

LOCAL DISEASES.

DISEASES OF THE RESPIRATORY SYSTEM.

1. PHYSICAL DIAGNOSIS.

Define Physical Diagnosis.

It is the art of discovering disease by means of the senses, especially with *the eye, the ear,* and *the touch.*

What are the methods employed?

They are: 1, *Inspection;* 2, *palpation;* 3, *mensuration;* 4, *succussion;* 5, *percussion;* 6, *auscultation.*

Which are of the greatest value?

Auscultation and *percussion,* usually, and especially in lung diseases.

What is inspection?

This signifies *the act of looking at.* Comparing one side with the other to note the condition of the parts.

What are the principal things to note on inspection?

It reveals the size, form, color, position, state of a part, together with the movements; the state of the pupils, the acts of respiration, etc., are thereby noted.

What is meant by palpation?

By *palpation* is understood *the application of the palmar surface of the hand and fingers,* to appreciate impressions which may be conveyed through the sense of touch.

What may be obtained by palpation?

The heart beat, the condition of swellings, the frequency of respirations, to locate spots of soreness, to ascertain whether the part is hot, cold, moist, or dry, and to otherwise prove what is revealed by inspection.

Define mensuration.

The act of measuring with a tape, and is seldom used, as it is of no practical importance. It consists of measuring from the withers to the sternum on either side, and comparing.

What is succussion?

It is *a splashing sound,* heard when the thoracic or abdominal cavity contains a large quantity of fluid and the body is given a sudden or jerky movement, the ear or hands being applied over the walls of the cavity.

The sound resembles that produced by the shaking of a keg partly filled with water.

Succussion is useful in the smaller animals, as they can be shaken to better advantage.

Define percussion.

This is *the act of striking a part* to ascertain the composition of the structures. *Percussion* is very important, and yields much information which is of value in making a diagnosis.

What are the methods employed?

There are two—*the immediate* and *the mediate.*

Define each.

The immediate (also called direct percussion) is performed by directly striking the walls of the thorax with the fingers, but this method is not much used.

Mediate, or *indirect percussion,* is where some medium (as the fingers, plexímeter, etc.) is placed over the part percussed and struck with the fingers or a hammer.

The so-called *digital percussion* is, in ordinary practice, probably the most practical, and the stroke should be performed from the wrist and perpendicularly to the surface.

What are the objects of percussion?

We *percuss* to obtain sounds which vary with the degree of elasticity or resistance of the parts percussed.

What are the principal sounds elicited?

They are *the tympanitic, the dull,* and *the clear,* and, to appreciate the difference, one must become familiar with the intensity, character, and pitch of these sounds.

In percussion of the normal chest what is obtained?

A clear or *normal pulmonary resonance;* as there is no exact standard, both sides should be percussed and compared to obtain the standard for each animal.

Name some of the abnormal sounds.

(1) *Hyper-resonance,* (2) *dulness,* (3) *tympanitic.*

What is hyper-resonance?

It is where there is more air present than is normally found, and for this reason elicits, on percussion, what is known as *increased resonance,* or *hyper-resonance.*

In what conditions do we obtain hyper-resonance?

In pulmonary emphysema, atrophy of the lungs, consolidation of the opposite lung.

Define dulness.

Dulness is the absence of resonance, and is due to an increase of solid material in proportion to the amount of air.

The pitch is increased or heightened, according to the amount of air and the increase of the solid tissue.

What is flatness?

If there be an entire absence of resonance, the sound elicited is called or said to be *flat.*

Where may dulness be obtained?

In the so-called second and third stages of pneumonia, in tuberculosis, and in some cases of pleurisy.

Flatness is obtained when percussing over fluid, as in pleurisy with effusion, hydrothorax, ascites, etc.

What is the tympanitic sound?

This is a *drum-like sound,* ringing in character, and higher pitched than the normal resonance, and is non-vesicular.

Explain the amphoric sound.

The amphoric or *metallic sound* is a tympanitic sound of high pitch, confined to one place, and is heard over a large cavity.

Describe cracked-pot sound.

Also a variety of the tympanitic sound; is heard over a cavity that communicates with the bronchial tubes.

Where may the tympanitic sound be obtained?

In flatulent colic, œdema of the lungs, in pleurisy above the level of the liquid, and in cavities of the lungs.

What is auscultation?

By this is understood *the act of listening* to sounds produced within the thoracic cavity during the act of respiration.

This method, which is the most important of the physical signs, offers the best means by which the various affections of the respiratory organs may be differentiated.

How may auscultation be accomplished?

By placing the ear directly against the chest-walls—called the *immediate* method; or by the use of instruments called the stethoscope and the phonendoscope—known as *mediate auscultation.* In ordinary practice the former is the more preferable.

What are the sounds heard within the normal chest?

Over the larynx or trachea a sound is heard within, termed the *normal laryngeal respiration;* it is heard both on inspiration and expiration, is high-pitched and tubular in character.

This sound is identical with the abnormal sound heard over the bronchial tubes, and called *bronchial breathing.*

Over the lung-tissue *the normal vesicular murmur* is heard, and is produced by the expansion and contraction of the air-vesicles of the lungs.

The inspiratory part of the sound is of variable intensity, its pitch is low, its quality soft and breezy, and is termed vesicular. It lasts during the entire act of inspiration.

The expiratory part is not always heard; its intensity is feeble, pitch is low, and of a soft and blowing character.

How may the normal sounds be altered?

The respiratory murmur may become altered in its intensity, in its rhythm, and in its character.

The intensity of the respiratory murmur may be *increased, diminished,* or *absent.*

What does increased respiration denote?

Increased or *exaggerated respiration* denotes a want of action of some other portion of the lung, and is therefore an indirect evidence of disease in some part of the lung-tissue.

Describe diminished respiration.

There is a diminished intensity and duration of the sound and is seen in old animals.

When is the murmur absent?

This occurs whenever there is a blocking up of the bronchial tubes or air-cells, or a filling of the pleural cavity with fluid, and thus causing pressure.

What changes may take place in the rhythm of the respiratory murmur?

It may be *interrupted, the interval between the inspiratory and expiratory acts prolonged,* or *the expiratory act prolonged.*

How may the quality of the respiratory murmur be changed?

It may be *harsh, bronchial, cavernous,* or *amphoric.*

Define each.

Harsh respiration, or *broncho-vesicular breathing,* is where both the inspiratory and expiratory sounds have lost their softness, and usually indicates consolidation of lung-tissue.

Bronchial respiration is characterized by the absence of all vesicular quality. Inspiration is high-pitched and tubular, while expiration is still higher pitched, prolonged, and tubular.

Cavernous respiration is a blowing sound, and not always heard during both acts of respiration. It is heard over a cavity communicating with the bronchial tubes.

Amphoric respiration is a blowing respiration, having a metallic or musical quality, and is heard over a large cavity with firm walls.

Define râles.

Râles are adventitious sounds, so-called because they have no analogue in health. They cannot be considered as modifications of respiration.

How may râles be divided?

They may be divided according to their character and according to their anatomical situation.

According to their character what kinds of râles are there?

Râles are either *dry* or *moist.*

According to the situation how are they divided?

Into *laryngeal, bronchial, vesicular, cavernous,* and *pleural.*

Describe dry râles.

Dry râles are produced when the bronchial tubes are narrowed from a thickening of the mucous membrane, or when the mucus present cannot be broken up by the air.

They are high-pitched when in the smaller bronchial tubes, and are called sibilant or whistling râles.

When in the larger tubes, they are low-pitched and are called sonorous râles. The position of dry râles is not influenced by respiration.

Describe moist râles.

These are produced by air passing through fluids that are readily displaced by the air during respiration.

When in the larger tubes, they are termed *large bubbling or mucous râles,* while in the smaller tubes they are called *small bubbling, mucous,* or *subcrepitant râles.*

Moist râles are influenced by respiration, and are thus liable to a change of position as the mucus becomes coughed up.

What are laryngeal râles?

Laryngeal or *tracheal râles* are those heard over the larynx or trachea, and may be either dry or moist râles.

Moist râles in this situation are known as *death rattles.*

Explain bronchial râles.

Bronchial râles are either dry or moist. The dry are called sibilant or sonorous, according to the situation; the moist are termed large or small bubbling or mucous râles.

Describe the vesicular râles.

This is a very fine sound or series of uniform and fine sounds, and heard only on inspiration. It is called a *crepitant râle,* and resembles the noise produced by throwing salt on a fire, or the rubbing of a lock of hair between the fingers.

This râle is heard during the first stage of pneumonia.

What are cavernous râles?

These are called *gurgling râles,* and heard over pulmonary cavities containing liquid and connecting with the bronchial tubes.

What are pleural râles?

They are sounds produced by the movement of the pleura, and may be dry or moist.

The *dry pleural râle,* or *friction sound,* is present in the first stage of pleurisy, produced by the rubbing together of the two roughened layers of the pleura.

The *moist pleural râle* may be heard in the third stage of pleurisy, as the fluid is becoming absorbed and the layers of the pleura are moist.

It may also be called *the rubbing and sticking sound.*

The *metallic tinkling* sound is heard especially during the second stage of pleurisy with effusion. It may be heard by applying the ear over the chest above the line of fluid, or, better, at the nostril.

2. DISEASES OF THE NASAL PASSAGE.

NASAL CATARRH.

How many and what are the forms of nasal catarrh?

There are two forms, the acute nasal catarrh and chronic nasal catarrh.

ACUTE NASAL CATARRH.

What are the synonyms?

Coryza, acute rhinitis, cold in the head.

Define acute nasal catarrh.

Catarrh signifies *to flow down.* It is an acute catarrhal inflammation of the mucous membrane lining the nasal cavity, characterized by fever and a discharge from the mucous membrane of the nose.

Give the causes of coryza.

Primary or so-called idiopathic coryza may arise from atmospheric changes, seen especially in the spring and autumn, when there is a chilling of the skin.

The inhalation of irritating gases, as smoke, particles of septic dust, dirty hay, or dirty feed.

This is rarely met with as a simple disease, it generally being associated with deeper inflammations, as following ulceration of the mucous membrane of the nose, in glanders, or it may be secondary to leucocythæmia, anæmia, pharyngitis, laryngitis.

Bacteria acting on the inflamed membrane.

What is the pathology?

Two stages are recognized—first, or *dry stage*, and second or *moist stage*.

There is an excessive amount of blood in the mucous membrane, which is reddened, thickened, and dry in the beginning; then there is an infiltration into the mucous membrane of the nose, causing a thin, watery discharge, the mucous glands beginning to secrete; the discharge becomes thickened and a sticky mucus after a time, or it may become muco-purulent on account of the desquamation of the cells of the mucous membrane and a generation of new cells.

What are the symptoms?

First Stage.—There is a cold in the head, the animal is dull and has an apparent headache, lessened appetite, more or less shivering, followed by fever (the temperature is elevated two, three, or four degrees).

The membranes being reddened, thickened, and dry, give rise to sneezing. This stage lasts from several hours to several days.

Second Stage.—Following this dry stage, the mucous membrane is shiny, much swollen, and œdematous; there is a discharge which at first is thin and watery, but soon becomes thickened and opaque and of a whitish color, due to the white blood-cells; in some cases it may be yellowish; crusts often form around nostrils.

The mucous membrane of the eyes becomes involved, being dry and reddened at first, but soon a discharge takes place, which at first is thin and watery, and later thick and pus-like.

What is the duration of an acute case?

The milder cases last about a week, while the more severe cases twice that time or longer, depending on the constitution of the animal and the severity of the attack.

How is this disease diagnosed?

The *diagnosis* is easy, the symptoms being usually well marked.

The discharge from the nose, the absence of symptoms of other diseases, and the elevation of temperature two or three degrees.

What is the prognosis?

It is favorable if seen early and the animal is otherwise in good health. Some cases, and especially neglected ones, often become chronic or complications may arise—eye, mouth, throat, sinuses, etc., may become involved; these cases last longer.

What is the treatment?

Both local and systemic.

In the milder cases, simple nursing may be all that is necessary.

Keep the body warm by the use of blankets and bandages. Put the animal in a box-stall where there is good, pure air, but free from drafts.

This trouble is often cut short by the use of quinine or opium with camphor. Steaming is also used; bran put in a pail, with hot water poured on, can be placed in a feed-bag and the animal allowed to inhale the steam, which is often very soothing. It is well not to confine the animal's head too completely but to allow a certain amount of air to be taken with the steam. A steam-producer is now in common use by veterinarians, the advantage being that disinfection can be accomplished at the same time.

If there is much fever, potassium nitrate and tartar emetic can be given in the drinking-water.

Injections to unload the rectum are often beneficial.

The diet should consist of bland food, easily digestible, which is far better than forcing too highly nitrogenous food.

CHRONIC NASAL CATARRH.

What are the synonyms?

Nasal gleet, ozena, chronic rhinitis, fetid nasal catarrh.

What is chronic nasal catarrh?

The word *catarrh* cannot properly be used, but it is held in many text-books.

It is a chronic inflammation of the mucous membrane lining the nasal passages, accompanied by more or less structural alteration and an increased discharge.

What is the ætiology?

It is much more rare than the acute form; it may follow an acute attack, or it may be caused by nasal polypi, or from irritating substances in the nose; also from decayed teeth, or it may depend on ulcerations of glanders, or an inflammation of the mucous membrane of the sinuses, or an accumulation of pus, or be associated with leucocythæmia, anæmia, or may be of specific origin.

What is the pathology?

The mucous membrane is of a dark-red color, at times grayish, is thickened more or less, the veins are often dilated and varicose and forming polypoid enlargements, or there may be ulceration of the structures with a more or less loss of substance.

The discharge is thick, of a greenish-yellow color, and often fetid. The mucus often dries on the septum or around the nostrils and forms crusts. These crusts often become dislodged in the act of sneezing, snorting, or coughing. The amount of discharge varies.

What is the semiology?

The disease is very often unilateral, and, if so, we should be suspicious of glanders, which is very often difficult to differentiate, except by the use of malleine.

The mucous membranes of the nose are very frequently of a bluish tint, with enlarged veins filled with blood. At times, the surface of the mucous membranes presents erosions.

There is a discharge, which varies in consistency and color; in some cases it is thin and watery, while in others it is opaque and contains broken-down material.

If the head is down near the ground or the animal is in motion, there is an increase in the amount of discharge.

In some cases there is swelling of the intermaxillary glands.

How is the disease diagnosed and what is the differential diagnosis?

We should first try to get the cause—that is, the disease to which it is secondary.

The diagnosis is made by the history of the case, the discharge having continued for a length of time; the color of the mucous membrane and the character of the discharge.

If the discharge is due to a decayed tooth, there will be a dis-

gusting odor present. If due to pus in the sinuses, there may be swelling of the bones of the head over that particular part; there will be dulness on percussion, and ofttimes it becomes necessary to trephine to enable us to make a diagnosis.

What is the prognosis and duration?

It is very often grave, these cases usually taking a long time to recover, should recovery take place at all.

It may take weeks, months, or possibly years.

What treatment is used?

Ozena is tedious to treat; some cases never get well. If the discharge is from the mucous membrane and there is no pus in the sinuses, inhalations are often very beneficial—tar placed on a shovel that has been heated, or sulphur, or juniper berry may be burned and the animal allowed to inhale the fumes; steam containing carbolic acid, creolin, terebin, etc.

Peroxide of hydrogen and lime-water (equal parts) may be found beneficial in some cases.

Injections may be used. A syringe has been invented for the human subject and from which good results have been obtained. Half per cent. solution of carbolic acid, zinc sulphate, nitrate of silver.

Powders, as iodoform, can be blown into the nose (insufflation). Blister over nasal cavity in some cases.

If pus is in the sinuses, trephine and allow it to escape; then syringe out the sinuses daily until the discharge has thoroughly stopped.

Internally, give good food, etc., to build up the system.

Copper sulphate, one to two drams, in ball. Cantharides, three to five grains, two or three times per day. In other cases, tartar emetic with sulphate of iron, given three times a day for a week or so.

Do not allow these animals to drink out of a trough where others drink. (A good rule in all cases where there is a discharge from the nose.)

EPISTAXIS.

What are the synonyms?

Nasal hemorrhage, nose-bleed.

Define epistaxis.

It comes from the two words, *epi*, signifying "upon," and *stazo*, "I drop." It is a symptom of some affection characterized by bleeding from the nose.

Give the ætiology and the symptoms.

On account of vascularity the mucous membrane of the nose is very prone to bleed. It is met with in hot weather, where the animal has been overdriven or overworked in the hot sun. The bleeding takes place from the nose on account of the congestion. The congestion may take place in the lungs or in the mucous membrane of the nose. *When the blood comes from the mucous membrane of the nose*, it is clear and flows in a stream, or drop by drop. *When it comes from the lungs*, it is frothy on account of being admixed with air.

Injuries, foreign bodies in the nasal cavity, knife of the surgeon, ulcerations or the action of micro-organisms. It is often the first symptom of glanders, and very frequently aids us in the diagnosis of that disease. Depressed condition of the system.

It may also be associated with strangles, purpura hæmorrhagica, leucocythæmia, hæmophilia.

What is the treatment?

The main principle of treatment is to keep the animal quiet; remove cause, apply ice to the face, blow tannin and the like up the nostrils. Five to ten per cent. solution chloride of iron or a solution of alum.

It may be necessary to plug up the nostrils—that is, to resort to pressure or the actual cautery.

Internally, iron, ergot, belladonna, tannin, pyrogallic acid, etc., according to the complications.

3. DISEASES OF THE LARYNX.

LARYNGITIS.

What are the synonyms?

Sore throat.

What are the forms of laryngitis?

Acute and chronic; some add the subacute.

ACUTE CATARRHAL LARYNGITIS.

What is acute catarrhal laryngitis?

It is an acute inflammation of the mucous membrane lining the larynx with products of a catarrhal inflammation, characterized by fever, a cough, and difficult deglutition.

What is the pathology?

There is redness, swelling, and softening of the mucous membrane of the larynx, which is at first dry, due to the arrest of the secretion of the mucous glands; soon we find the membrane covered with mucus, which contains epithelial and pus-cells.

On post mortem, there is often less redness and swelling than there is during life, owing to the richness of elastic tissue. The redness and swelling are due to an increased amount of blood and the infiltration into the membrane.

The inflammation runs a more or less rapid course, and the parts return to the normal; in some cases it may become chronic. If superficial erosions are present, there may be ecchymotic spots, or even an escape of blood, due to an involvement of the capillary vessels.

In some cases it is limited to a portion of the larynx, chiefly near the epiglottis, in which case it is apt to be associated with an inflammation of the fauces and pharynx.

The danger in this form of laryngitis is due to the submucous inflammation as well as to spasm of the glottis, which the infiltration causes.

What is the ætiology?

It is caused by chillings of the skin, as when the animals have long hair and sweat easily. It is often seen in the spring or fall, when there is a change in the atmosphere.

It is also caused by inhalations of irritating gases, smoke, dust, etc. Continued pressure or mechanical injuries to the larynx may be a cause, as a tight throat latch; it is often associated with strangles, nasal catarrh, influenza, etc.

Micro-organisms play an important part.

What are the symptoms of acute laryngitis?

A chill may be present and there are well-marked febrile symptoms; the pulse is quickened and full, the temperature is 105° to 106° F., and there is a cough present which is at first dry and

husky and hard, but after a time it becomes looser and is often accompanied by an expectoration. In some cases the cough is suppressed on account of the pain.

The *position of the head* is often well-marked, the nose being extended in the air in a more or less horizontal position.

Pressure over the larynx with the fingers causes the animal to throw his head up in the air and to cough.

We should be careful not to make the animal cough after we have made our diagnosis, as it produces pain and irritation.

There is apt to be an impairment of the appetite, the animal being unable in many instances to swallow solid food.

The glands in that region are more or less swollen. The respirations may be interfered with, when the swelling about the glottis is extensive.

How is the disease diagnosed?

By the exceedingly *high temperature*, by the *position of the head*, by *the cough*, and by the *difficulty in swallowing* solid food and *pain on pressure* over that region.

What is the prognosis?

The *prognosis* is good, as a rule, the case lasting ten days to two weeks or longer.

How would you treat a case of this sort?

The treatment varies somewhat; counter-irritation, in the form of liniments or mustard, a second application often being necessary. Others prefer blister, which is not so irritating and is more lasting in its action.

Internally, we should avoid bulky medicines, as they cause irritation and are apt to be coughed up.

Belladonna extract, two drams, which makes a small pill, can be given.

If the animal does not eat well and is debilitated, quinine should be given.

The fluid extract of aconite and belladonna, syringed into the mouth and fauces, acts generally and locally.

Electuaries are especially indicated in these cases; they may contain potassium chlorate, or boracic acid, or camphor, or opium, or powdered belladonna root, etc., mixed with licorice root and molasses or honey.

A gargle of silver nitrate may be thrown back into the fauces by means of a syringe, or the tincture of capsicum may be so used; these irritate during first stages.

Carbolic acid, alum, potassium chlorate, etc., may also be used. A two per cent. solution of cocaine may be used, especially in the latter stages, where a hacking cough remains.

Steaming with hot water medicated with a non-irritating disinfectant vapor is very useful, in connection with a gargle, electuary, or counter-irritation.

Where the fever is high and the membrane is dry, potassium nitrate with small doses of tartar emetic can be given in the drinking-water two, three, or four times a day.

Bland food should be given, and food that is easily digested, especially when the fever is high. Bran mashes, or a layer of oats and bran with a pinch of salt, and hot water, often tempts these animals to try to eat.

Be sure that the manger is perfectly clean; have it washed out thoroughly, as it may contain food wet with the discharge from the throat. It is well to feed these animals out of a clean pail and tempt them to eat.

CHRONIC LARYNGITIS.

What is the synonym?

Chronic sore throat.

Define chronic laryngitis.

It is a chronic inflammation of the lining membrane of the larynx, with an involvement of the submucous tissue, characterized by a persistent cough.

What is the pathology?

The mucous membrane is more or less coated with mucus or pus. The membrane is darker in color, often a grayish-red or a bluish tint, due to the ecchymosis; the membrane may be softer or firmer than normal, and the mucous glands are more or less large and prominent, with a thickening of the submucous tissue. If the membrane of the trachea is involved, it becomes reddened over the rings and darker or grayish in between.

What is the causation?

It may occur as a primary disease or as the result of several acute attacks; or, again, it may be the sequela or an extension of a pharyngitis, or a chronic nasal catarrh, or a bronchitis.

What are the symptoms?

They seem to be altogether local, and consist principally in a hoarse and husky persistent cough, the animal otherwise being apparently healthy; they eat well and seem to feel well.

If the animal is taken out of a warm stall into the cooler air, he coughs for a time, causing a white mucous discharge. There is some pain on pressure over the larynx, associated with coughing; there is thickening of the mucous membrane, with varicose veins.

What is the prognosis?

This depends on the pathological changes; *the prognosis* is good as regards life. These cases are often hard to cure, especially in old animals.

What is the treatment?

The treatment should be both *constitutional* and *local*, and is about the same as for an acute case. The cough may be quieted by giving sodium bromide, or a solution of morphine, or belladonna, or cocaine.

Locally, counter-irritation may be of service; also, astringent gargles. Swabbing out throat with astringent or slight caustic solutions.

LARYNGEAL ŒDEMA.

What are the synonyms?

Œdematous laryngitis, dropsy of larynx, œdema of the glottis (incorrectly so called).

Give a definition of this affection.

It is a term used to indicate the occurrence of a dropsical effusion or an inflammatory exudation into the areolar tissue beneath the laryngeal membrane. It is really not an œdema of the glottis, but of the upper portion of the larynx.

What is the pathology?

The effusion is generally of a serous or sero-purulent character, and is found in the loose cellular tissue beneath the mucous mem-

brane, principally at the base of the epiglottis, which is usually swollen a great deal.

The mucous membrane may be red or pale; the effusion may be on one or both sides, in some cases interfering very materially with the entrance of air.

Give the causes.

It generally follows an acute case of laryngitis or pharyngitis, or it may be associated with blood diseases, as purpura hæmorrhagica, glanders, pneumonia, or pleurisy. The swallowing of irritants, or injuries may be a cause.

How is the diagnosis made and what are the symptoms?

It may show itself suddenly. *The most prominent symptom is dyspnœa,* and the difficulty seems to be confined to inspiration at first. There is not much difficulty in swallowing, nor is there much pain on pressure over that region. There does not seem to be much fever or other constitutional symptoms accompanying laryngitis.

The breathing becomes noisy or difficult, there is an anxious look, the eye becomes prominent, there are cold sweats, the animal becomes uneasy, and fits of coughing may be present.

There is a swelling of the neck over that region, and if the hand is introduced into the fauces the œdematous condition may be felt.

What is the prognosis?

The prognosis should always be guarded, governed largely by the cause of the œdema. Aseptic tracheotomy, strict hygienic measures, careful nursing, and judicious nourishment will save the majority of cases.

What is the treatment?

The object is to prevent suffocation, and there is not much time to be lost; the trachea should be opened at once.

Stimulants are usually indicated; also diuretics and absorbents.

ROARING.

Give the synonyms.

Chronic whistling, laryngeal hemiplegia, stenosis of the trachea, laryngismus paralyticus.

What is understood by the term "roaring"?

It is a symptom of a diseased condition of part of the respiratory tract, characterized by an abnormal sound heard during the act of respiration, and at a variable distance from the patient.

Give the causes.

In the majority of cases it is caused by an atrophy and a degeneration of the dilator muscles of the glottis—the posterior crico-arytenoid muscles. All these muscles are innervated by the inferior laryngeal nerve, which is a branch of the pneumogastric. One of these nerves often loses its influence, becoming paralyzed and undergoing fatty degeneration.

The left recurrent laryngeal nerve runs through a bunch of lymphatic glands, which often become enlarged and press on the nerve. The left recurrent laryngeal nerve, being more superficial, is thus more liable to injuries; other than this, it is hard to tell why the left side is more frequently affected. The dilators undergo fatty degeneration, and, the air striking the vocal cords, causes vibration of them, and thus produces the sound. Some authors claim the healthy cord is thrown into vibration, thus causing the sound.

It may depend on tumors in the nose, a thickening of the mucous membrane, fracture of the cartilage of the trachea. In some cases fibrous bands have been found; tumors in the chest also produce this sound; alteration in the shape of the trachea, the result of high checking, or traumatisms.

Hereditary tendency comes into play; the horses with Roman noses and long, thin necks seem to be more predisposed than the others; also, those of a lymphatic disposition, which are liable to lymphatic disorders, and in this way causing pressure on the nerve.

How is roaring diagnosed?

There are two degrees of the sound produced, which differ in tone and quality. When it is *high pitched* it is called *whistling*, and the animal is known as *a whistler;* when it is of a *low pitch* it is called *roaring*, and the animal is called a *roarer*. Percival experimented on these cases, and found that the greater the constriction the more high-pitched the sound.

The best way to detect these cases is to give the animal a sharp gallop, and especially up grade (as up a hill), and then, having the animal stop suddenly, listen to his breathing; or back the

animal down a run, and if he is a whistler he will show it. Drawing heavy loads, especially in mud or snow, will often cause the sound to be heard. In some cases the sound can be detected by auscultation over the trachea when the horse is at rest.

What is the prognosis?

Depends a great deal on the cause; the prognosis is usually grave as regards a cure.

In some few cases relief may be afforded and the animal able to do slow, easy work. The disease is slow in its course.

Outline the treatment.

Tracheotomy or *laryngotomy* may be resorted to, but the tubes, being foreign bodies, produce a great deal of inconvenience; again, the air enters directly into the lungs, possibly filled with dust, etc., and is not heated.

Sometimes blistering is used; also, electricity and strychnine; but there seems to be no satisfactory way of treating this trouble.

If tubes are put in permanently, they have to be taken out every three or four weeks or oftener, the parts and tubes thoroughly cleansed, and the same or another tube replaced.

A resection of the vocal cords, called *arytenectomy*, has been resorted to and has met with varying success.

4. DISEASES OF THE BRONCHI.

BRONCHITIS.

Define bronchitis.

Bronchitis is essentially an inflammation of the mucous membrane of the larynx, trachea, and bronchial tubes (the large or small).

What are the forms of bronchitis?

Clinically and pathologically, bronchitis in the horse may be divided into ACUTE CATARRHAL BRONCHITIS OF THE LARGE TUBES, CHRONIC CATARRHAL BRONCHITIS, ACUTE CAPILLARY BRONCHITIS, BRONCHIECTASIS.

ACUTE CATARRHAL BRONCHITIS.

Give the synonyms.

Bronchial catarrh, cold on the chest.

What is acute catarrhal bronchitis?

It is an acute catarrhal inflammation of the mucous membrane lining the larger and middle-sized bronchial tubes.

What is the pathology?

The pathology does not differ very materially in any of the forms—that is, whether the larger or the smaller tubes are affected. As a rule, it does not originate in the tubes themselves, it probably being a continuation of an inflammation of some of the adjacent structures.

The mucous membrane becomes reddened and swollen, either uniformly so or in patches, and dry; soon the tubes contain a clear, transparent mucus, which, after a time, becomes opaque, whitish, yellowish, or even greenish in color, changing according to the amount of pus-cells that are present. As a rule, the tubes on both sides seem to be equally affected.

What are the causes?

It may be the result of debility, constitutional diseases, sudden changes in the atmosphere, inhalations of impure air, irritating gases, etc., chillings of the skin, foreign bodies in the bronchial tubes, improper drenching.

It may be associated or secondary to other diseases, as influenza, glanders, pneumonia, or it may be caused by micro-organisms.

What are the symptoms?

At the onset it may be marked by coryza, sore throat, and with shiverings; as the disease develops, the pulse becomes frequent, soft, and weak, but quick; there is a high fever, the temperature ranging generally between 105° and 106° F.; the respirations are quickened and more or less difficult.

There is more or less interference with the appetite, there is thirst, the visible mucous membranes are reddened, there is a lessening of the secretions and excretions, the urine being high-colored and scanty.

The cough which is present seems to be the essential feature

of the disease; at first it is dry, hard, and hacking in character; after a day or two the cough becomes looser and is accompanied by an expectoration, which consists of a frothy mucus, having a yellowish color, and sticky; this expectoration gradually becomes pus-like. After the expectoration is present the animal seems somewhat relieved.

What are the physical signs?

In the milder forms of acute bronchial catarrh, where the larger tubes are affected, there may be no special physical signs which can be appreciated. The more severe forms are attended by physical signs that can be readily recognized.

In the majority of cases, on *inspection* and *palpation,* there is nothing to be appreciated. On *percussion* the sounds are normal in the majority of cases; on account of the thickness of the skin and the hair we are unable, in the horse, to appreciate any change. On *auscultation* we find the respiratory murmur feeble or somewhat harsh in character. In the dry stage *sibilant* and *sonorous râles* can be heard on both sides of the chest. In the second stage, or the stage of secretion, *moist râles* (large and small) may be heard on both sides of the chest; these moist râles come and go, on account of the mucus changing its position; and, after a violent fit of coughing, they may disappear temporarily.

The auscultatory sounds may be absent at times, so that their absence does not signify that the disease is not present.

How is the disease diagnosed?

Mostly by the *physical signs* applied to *both sides of the chest;* on percussion, no appreciable change; on auscultation, sibilant and sonorous râles in the first stage, and mucous râles (large and small) in the second stage; also, the cough and fever aid us as well as the absence of signs of pneumonia or pleurisy.

Give the prognosis.

It is generally good if not complicated.

What is the treatment?

General and *local* treatment is required.

Avoid depleting measures, as a rule; stimulation is recommended; try to aid discharge from mucous membrane by inhalations.

Early sedatives or opiates may be of benefit in some cases, while in others carbonate of ammonia (stimulating expectorant) or the muriate or chloride of ammonia.

Camphor with ammonium carbonate is often good. Tartar emetic in dry stage is indicated, as it hastens secretion. Powdered digitalis with ammonium carbonate are beneficial where heart is irregular.

If loss of appetite, try to stimulate it with nux vomica, gentian, etc., added to pills; or, better, doses of the tincture of nux vomica for its bitter effect. Alcohol or whiskey and quinine in some cases.

Local Treatment.—Counter-irritation. Mustard recommended by some, but it seems to be going out of date—irritates too much. Oiled silk applied around the chest and retained there by means of a sixteen-foot flannel bandage is probably the best form of counter-irritation; the silk, being impervious to air, keeps up a constant sweating, which has a continuous and mild rubefacient effect.

Soap liniment, with the addition of two ounces of tincture of opium, rubbed in well, is often beneficial.

In some cases enemas of water are recommended.

Put the animal in a box-stall having a temperature of about 60° to 65° F. (No drafts, but pure air.) Blanket the animal, give the extremities a good hand-rubbing, and apply bandages.

Potassium nitrate in drinking-water makes a cooling drink and relieves the fever.

If the animal does not eat well or if the heart is weak, alcohol or whiskey may be substituted in the drinking-water.

Food.—The animal should be fed on bran mashes, grass, carrots, apples, or, in some cases, steamed oats.

CHRONIC BRONCHITIS.

Give the definition.

It is a chronic inflammation of the mucous membrane lining the larger and middle-sized bronchial tubes, *characterized by a cough.*

What is the morbid anatomy?

The mucous membrane shows a variety of changes, depending on the disease with which it is associated; sometimes it is thin,

the elastic tissue being prominent, the tubes dilated, the glands atrophied, and a wasting of the muscular tissue.

In other cases the mucous membrane is thick, granular, and infiltrated, and may show erosions. The mucous membrane is generally of a dull red color, with the veins dilated and varicosed.

Give the causation.

It is seen more frequently in old animals, and due to repeated attacks of the acute form; it may be secondary to chronic lung diseases, as emphysema, or in chronic heart troubles, where the blood is backed up in the lungs, causing an irritation to the bronchial mucous membrane. It is also seen in renal diseases. It may be of specific origin.

What are the symptoms?

There is a distressing cough, with a thick or thin whitish or yellowish-white expectoration, aggravated during changeable weather.

In old animals, suffering from heart disease or pulmonary emphysema, there is an alteration of the respiration; the animal puffs, especially on exertion, as the pulling of heavy loads or in going up hill. As a rule, there is no rise of temperature, except, possibly, a degree or two at the beginning or increase of the attack.

Give the physical signs.

The chest may be somewhat distended and the movements limited.

Percussion shows a clear or increased resonance.

Auscultation shows the expiration somewhat prolonged and wheezing; râles may be heard, varying in character, some being high-pitched, others low, and some mucous râles.

What is the prognosis?

It is hard to cure, as a rule, and can only be relieved. It is apt to become exaggerated during changeable weather.

Outline the treatment.

This depends largely on the complications present; a change of air is often beneficial where the attack is prolonged; in the city send horses to the country.

If there is excessive secretion, muriate of ammonia and senega, or the iodide of potassium with nitric acid, is often good.

Turpentine, given in small doses, say fifteen to thirty minims in alcohol. The tincture ferri muriatis checks the secretion and tones up the heart and muscles of bronchial tubes.

Zinc is indicated to stop excessive secretion from the bronchial mucous membrane; it seems to enter into chemical combination with pus. It diminishes the cough.

Stimulating expectorants are generally contra-indicated.

If the heart is feeble, digitalis and strychnine, balsam of Peru, or tolu. Inhalations of eucalyptus, tar, sulphur, juniper berry, etc.

Carbolic-acid gargles are often good, especially if there is any odor to the discharge.

Counter irritation, as blister to the chest, may be useful in some cases.

BRONCHIECTASIS.

Give the definition.

This is a cylindrical or saccular dilatation of the bronchial tubes.

Name the causes.

This may be the result of chronic bronchitis or from inflammations of various sorts; aneurisms, pressure, pleuritic adhesions are among the causes.

What are the most important symptoms?

There is a paroxysmal cough, especially on a change of position, as the animal standing up after being in a recumbent position for a time.

There are no characteristic symptoms, and the condition is hard to diagnose.

It is seen more in the bovine species, and is often mistaken for tuberculosis, as earthy deposits may take place in the bronchial tubes, which show dulness on percussion, and thus the liability to the mistake.

Is there any treatment?

This is probably only interesting to us on post mortem, as not very much can be done for these cases.

Treat symptomatically as the case requires.

5. DISEASES OF THE LUNGS.

PULMONARY CONGESTION.

Give the synonyms.

Hyperæmia of the lungs, congestion of the lungs.

Define the same.

It is an increase in, or an abnormal fulness of, the capillaries of the air-cells.

Name the forms.

There are two forms—*the active* and *the passive.*

ACTIVE CONGESTION OF THE LUNGS.

Active fluxion of the lungs occurs where the heart's action is increased; over-exertion, or the breathing of hot or cold air or irritating gases.

Usually seen late in the fall, where the horse has been standing in the stable for some time, fed well, and taken out for a spin up the road and driven at a lively gait; the first snow-storm, when the animal is taken out and made to go fast.

Active congestion is also seen in draft horses, especially green horses, in the summer-time, during hot weather, where the animals are forced and overworked.

A horse taken on trial, where they want to test him, and thus overload and over-drive the animal.

What are the symptoms?

Of the active form, there are no positive symptoms.

Congestion being the first stage of all respiratory inflammations, it may be succeeded by pneumonia, bronchitis, pleurisy, etc.

A chill may be present at the onset, followed by a rise of temperature, which varies from 103° to 105° F.; the respirations are rapid—inspiration and expiration become difficult, and a cough is often present; the pulse is weak and debilitated (an obstructive pulse). The ears and extremities are often cold to the feel.

Give the physical signs.

They are not positive; on percussion, resonance; on auscultation, undetermined sounds—may get a feeble or harsh breathing.

How is the condition diagnosed?

By the suddenness of the attack, by the fever, the condition and age of the animal.

PASSIVE CONGESTION OF THE LUNGS.

This is where there is some obstruction in the blood-vessels to the outflow of blood, with the result of a damming back of blood into the vessels of the lungs.

Name the forms.

Two forms are recognized—*mechanical* and *hypostatic.*

Give the ætiology.

The mechanical form is caused by some obstruction to the return flow of blood to the heart, and is seen in disease of the left side of the heart; old horses; then, again, pressure of tumors.

Hypostatic congestion is due to both a weakened heart and to the lying in one position for some time.

What is seen on post mortem?

The lungs are large, russet-brown color, rather tough to cut or tear.

On section, there is a brown-red color, which brightens on exposure to the air from the oxidation of increased amount of hæmoglobin.

If a post mortem is desired, turn the animal on its back immediately after death, and thus cause the blood to gravitate to the upper part of the lungs, so as not to interfere with the examination of the lower parts, which are more usually affected.

What are the symptoms?

Are often vague; there is difficult breathing, a cough, the animal refuses to eat, the temperature varies from 101° to 102° F., the pulse is irregular, and the animal is usually old and run down.

Give the prognosis.

Most cases get well. Those associated with chronic heart disease become relieved temporarily.

Be guarded with the prognosis, as the symptoms may hang on three or four days and the animal die from œdema of the lungs.

Give the treatment.

Look to the condition with which the congestion is associated, if any be present.

In the active form, sedatives, in some few cases, may be given. In city practice, most cases require stimulants, as alcohol, carbonate of ammonia; quinine, belladonna, and nux vomica are indicated.

Counter-irritation, as mustard, especially where the extremities are cold and the pulse is weak. It relieves congestion, stimulates the heart, and warms the extremities.

PULMONARY ŒDEMA.

What is the synonym?

Œdema of the lungs.

Give the definition.

It is an accumulation of serosity in the air-cells and bronchioles, characterized principally by dyspnœa.

It may be a termination of congestion, or in death from anæmia, purpura hæmorrhagica, diseases of the heart, or brain, or lungs; the death rattles can be heard.

What is the pathology?

The lung is heavy, pits on pressure, looks watery, and a clear serum flows from the cut surface, sometimes admixed with blood.

A gelatinous, infiltrated appearance is present, and there is an increased tension in the pulmonary system and the presence of watery plasma.

The blood backs up in the lung capillaries till transudation takes place.

Give the symptoms.

There is an increase in the symptoms of the disease present, whether of the kidneys, lungs, heart, or a general disease. *Dyspnœa* increases, a painful cough is present, there may be a *discharge from the nose* of a frothy, serous nature. There is an altered resonance, liquid râles are heard on inspiration and expiration. In inflammatory œdema fever is present, and some of the signs of pneumonia.

This condition is seen, in man, with Bright's disease; the ankles swell, it travels up the legs to the belly, and the patient gets water-logged and dies from œdema of the lungs.

What is the prognosis?

The prognosis is grave, these cases usually terminating in death.

Give the indications for treatment.

Look after the primary disease. Stimulants are indicated, as are diuretics. Act on the bowels in some cases. Counter-irritation may be of service. Iodide of potassium or the carbonate of potassium can be used in most cases.

BRONCHO-PULMONARY HEMORRHAGE.

Give the synonyms.

Pulmonary apoplexy, pulmonary hemorrhage, pneumorrhagia, hæmoptysis, bronchorrhagia.

Define these various terms.

The blood may come either from the bronchial mucous membrane or from the air-cells and lung tissue, or both, and hence the terms.

Pulmonary apoplexy, or *pneumorrhagia*, is an effusion of blood into the air-cells and interstitial tissue.

Hæmoptysis is really a spitting of blood which comes from the bronchial mucous membrane (*bronchorrhagia*).

Give the causation.

Pulmonary hemorrhage may occur without any obvious cause; it may occur in heart diseases, where the valves are affected; it may be associated with infectious diseases, ulceration of the larynx, trachea, with glanders, purpura hæmorrhagica, gangrene, or mechanical injuries. It may be due to aneurism, thrombus, embolus.

The infarctions in the lungs are wedge-shape, with the base situated at the surface of the lung and the apex toward the centre.

Give the symptoms.

Of pulmonary hemorrhage, the symptoms are often uncertain.

If the part involved is large, there may be signs of consolidation associated with blowing respiration. Auscultation may show large bubbling râles.

The animal may become nervous, restless, cough, sweat freely, and show varying symptoms of hemorrhage; if it becomes pro-

fuse, the pulse becomes thready, the mucous membrane pale, the extremities cold.

Hæmoptysis comes on suddenly, possibly after a hard drive; the animal coughs, blood comes from the nose and mouth, which may be only an oozing or a sufficient quantity to produce death by suffocation. It is a frothy, bloody discharge.

Blood coming from the lungs is generally alkaline in reaction, frothy, mixed with mucus.

Blood-clots may be seen, the shape of the smaller bronchial tubes; bubbles are frequently present in the blood-clots.

The owner becomes alarmed, but there is no immediate danger, except, possibly, where there is an aortic aneurism.

Outline the treatment of broncho-pulmonary hemorrhage.

Before treating, we should look to our physiology; it tells us that the pressure within the pulmonary artery is less than that of the aortic system.

Experimentally, with drugs, we find that an influence may be made on the *blood-pressure of the system*, without affecting *the pulmonary circulation.*

Ergot causes a rise of blood-pressure in the pulmonary artery, while aconite produces a fall of blood-pressure.

Iron preparations are good.

The indications are to reduce the frequency of the heart-beat and to lower blood-pressure.

Perfect rest and light feeding are important.

Alcohol is contra-indicated, as a rule, as is digitalis and ergot.

Sulphuric acid in small doses—one-half ounce—may be beneficial.

Opium relieves the cough and gives beneficial results in these cases, as it slows the heart's action.

Aconite is good where there is much vascular excitement, as it lowers blood-pressure.

Purgation is beneficial for the same reason.

The danger is the filling up of the bronchial system with blood, so that in these cases cough should be encouraged and not stopped.

Locally, cold applications to chest.

Inhalations of vapor of vinegar.

PNEUMONIA.

What is the synonym?

Lung fever.

Give the forms.

(1) LOBAR, where the lobes of the lungs are affected; (2) LOBULAR, where the lobules of the lungs are the seat; (3) INTERSTITIAL, where the connective tissue is involved.

ACUTE LOBAR PNEUMONIA.

Give the synonyms.

Croupous pneumonia; fibrinous pneumonia; pulmonitis; pneumonitis; commonly called lung fever.

The term "pneumonia" alone is usually used to indicate this form.

Define acute lobar pneumonia.

It is an acute, general, infectious disease, characterized by a local inflammation of the vesicular structures of the lungs, with an exudation into their alveoli which renders them impermeable to air, together with a general systemic disturbance of varying intensity produced by toxines.

What is the ætiology?

It is said to be caused by germs—by the *micrococcus lanceolatus, diplococcus pneumoniæ, pneumococcus.*

This form of pneumonia is seen among young and vigorous animals—those that are well nourished, apparently in good health and in active use.

Changes in the temperature, irritating gases, when breathed; also, mechanical bodies in the bronchial tubes or medicines poured into the trachea favor its development; also external burns over a large space; traumatisms (horses run into with a pole or shaft, which strikes between the ribs); in other cases no cause can be attributed. In man, one attack predisposes another, but it does not seem to be the rule in our animals.

What is the morbid anatomy?

For study, pneumonia has been divided into three stages:

(1) The stage of *congestion,* (2) the stage of *red hepatization,* (3) the stage of *gray hepatization.*

First Stage.—*Congestion, engorgement,* or *hyperæmia.*

Usually the antero-inferior part of the lung is involved, the disease extending upward and backward.

The lung is of a deep-red color, somewhat firm to the feel, and more solid; it crepitates somewhat, floats in water, but not as well as normally.

On section, the surface exudes a thin, albuminous, and bloody fluid.

Second Stage.—*Exudation* or *red hepatization.*

The lungs look somewhat like liver tissue.

If you open the thorax, the lungs look swollen; they do not collapse, and often the markings of the ribs can be seen.

The lung is solid, does not contain air, and sinks immediately if thrown in water.

The air-cells are filled up by the exudation, which consists of a viscid, fibrinous fluid, mixed with red and white cells, which rapidly coagulates, enclosing the corpuscles and completely filling the alveoli.

On section, the surface is dry, of a reddish-brown color, and granular.

The exudate becomes prominent, sticks out, and gives this granular appearance.

The lung tissue is very easily torn; the finger can be thrust into it, and it tears readily.

Hepatization is not general over the lung; it usually constitutes one-third or one-half of one lung.

Some few cases may involve both lungs, when it is called *double* or *bilateral pneumonia.*

Most cases are unilateral—that is, a part of one lung being involved.

Third Stage.—*Gray hepatization, resolution.*

There is no line of demarcation between the second and third stages; the change is more or less gradual from a red-brown color to a grayish white.

The surface is more moist, the lung is more friable, the plugs of exudation are less distinct, the lungs present a marbled appearance, there being less red blood-cells and fibrine, and more leucocytes. The lung does not crepitate, sinking immediately in water.

If resolution is retarded, part of the exudation undergoes purulent transformation, the color changes to a greenish yellow, pus-

cells are formed, and the part becomes a soft granular or fatty mass.

What are the terminations of pneumonia?

Pneumonia may end either in *resolution, production,* or *destruction.*

Resolution is where the exudation undergoes liquefaction and becomes absorbed; the cellular elements become fatty and the greater part absorbed, very little being expectorated.

By resolution the lungs return to their *normal condition,* this being the most frequent termination and the one desired.

In man, the death-rate is very high—probably one recovery out of three or four cases. Between the ages of fifteen and thirty years the prognosis is good in man.

In the horse, on the other hand, eight out of ten recover.

By production we mean an increase of tissue, as *chronic* or *interstitial pneumonia,* where there is an increase of interstitial tissue.

This is a rare termination in the horse.

By destruction, either *suppuration* or *gangrene* takes place.

Where suppuration takes place or an abscess forms in these cases, the symptoms do not subside, the fever remains high or increases, there is a loss of appetite, sour breath, and death from exhaustion.

In gangrene of the lungs the circulation stops and putrefactive germs gain access to the part, and the part dies.

There is a fetid odor to the breath, gangrenous, the respirations are rapid, and moist râles are heard on auscultation, the animal dying; heart-failure may cause death.

What is the duration of the stages?

The *stage of congestion,* one to three days; the *stage of red hepatization,* from three to seven or eight days; the *stage of resolution,* from seven or eight days to three weeks.

What are the symptoms of pneumonia?

It is generally ushered in with a chill, with muscular trembling, coldness of the extremities, etc. May be slight or severe chill.

The chill is followed by febrile symptoms, skin hot, with a marked rise of *temperature* in the early stages, it being 105° or 106° F. It may drop somewhat when the exudation is poured out.

There is an increased frequency of the *pulse,* which may be

50 or 60, and is usually full and bounding at first. The ratio between the pulse and respiration is lost.

Respirations are accelerated at first; the nostrils dilate with each inspiration.

The mucous membranes are congested, sometimes cyanotic. The conjunctivæ should be examined in suspected cases, as it may assume a yellowish color (jaundiced).

There is a tendency to remain standing; the horse does not, as a rule, lie down until the crisis. When they lie down, they do so from weakness or toward the end, and on the diseased side. When they lie down late, it is a more favorable symptom.

There is a loss of appetite, more or less, thirst is increased, and the secretions diminished. The urine is high-colored and scanty; constipation is usually present.

Cough frequent, short, shallow, and restrained. Dry at first; later, moist.

If laryngitis, bronchitis, or pleurisy be present, they may cough.

In the human subject the prune-juice expectoration is seen in some cases; this discharge is often present in the horse, and although it is not necessarily fatal, it usually shows a severe form of the disease.

In the severe cases the conjunctiva assumes a peculiar color—a mahogany color in spots, and between these spots a yellowish discoloration; this condition may be seen in colic and the like.

Certain nervous signs may be present; the horse becomes dull, with an apparent headache; or in other cases, slight delirium may be shown.

The *crisis* is usually the eighth day. It varies from seven to ten days. The temperature falls rapidly in these cases.

In other cases there may be gradual reduction of fever—a degree or so at a time. An elevation of temperature at this time usually denotes death or an increase of the disease (*a relapse,* as we call it).

Give the physical diagnosis.

In many cases we do not see pneumonia in the congestive stage, as when we are called the stage of hepatization is generally reached.

In the *first stage,* or the *stage of congestion,* we find, ON INSPECTION, the movement less on the affected side; ON PERCUSSION, no appreciable change is shown. ON AUSCULTATION, *crepitant râles*

are heard only on inspiration; best heard at the end of inspiration; these are fine, crackling sounds, like salt thrown on a fire, or like the sound caused by rolling hair between one's fingers.

They are *dry râles,* and said to be *pathognomonic* of pneumonia. They are usually present from twenty-four to forty-eight hours, and then pass away.

In the *second stage,* or *stage of red hepatization,* ON INSPECTION, there is a loss of the expansive powers of the chest on affected side; the respirations are panting in character; ON PERCUSSION, there is dulness on an uneven line over the affected portion; ON AUSCULTATION, in the majority of cases, there is an absence of all respiratory sounds (absence of the vesicular murmur) over the affected part, while bronchial breathing may be heard above.

In the *third stage,* as resolution commences, ON AUSCULTATION, there may be the *returning râle,* or *râle redux crepitus;* these moist râles of all sizes are heard on inspiration and expiration. ON PERCUSSION, the dulness will be found to be getting less marked.

How is the diagnosis made?

By the elevation of the temperature, 104° to 106° F.; by the expectoration, which is often brownish in color (*prune-juice expectoration*); by the *crepitant râles* heard in the first stage; by the *dulness on percussion* over the affected part (generally unilateral), and the *loss of all respiratory sounds* over the affected part in the second stage.

What other diseases may be mistaken for acute lobar pneumonia?

Acute bronchitis and pleurisy, principally.

Give the differential diagnosis between acute bronchitis and acute lobar pneumonia.

Bronchitis is a *bilateral disease,* whereas *pneumonia* is generally *unilateral;* in *bronchitis* the cough is accompanied with a whitish expectoration, while in *pneumonia* it is of a brownish color, as a rule.

In the first stage, ON AUSCULTATION, in bronchitis, *sibilant* and *sonorous râles* are heard on both sides of the chest, while in pneumonia *crepitant râles* are heard on one side only in the majority of cases.

In the second stage, PERCUSSION in bronchitis yields *resonance* (both sides); in pneumonia, *dulness* over the affected part (one side,

usually). AUSCULTATION in bronchitis, *large* and *small mucous râles* coming and going; in pneumonia, *loss of all sound over the affected part.*

In the third stage, ON AUSCULTATION, *vesicular bronchial breathing* (respiratory murmur harsh); in pneumonia, *returning râles* (*râle redûx*)—moist râles of various sorts.

What complications may arise?

Most common are *pleurisy, laminitis, pericarditis,* and *œdema of the lungs.*

Pleurisy is often a complication from the start, and receives the name of *pleuro-pneumonia* in these cases; where it is only secondary and a slight pleurisy, it is termed *pneumonia complicated with pleurisy.*

In other cases the horse becomes stiffened up (as we call it), the feet become hot, and there are signs of *laminitis.*

Pericarditis is apt to set in about the time of crisis.

The pulse becomes very rapid and feeble, and in some cases we are unable to count the beats. The heart-sounds become muffled, dyspnœa is great, and the physical signs are generally difficult to make out.

Give the prognosis.

This varies, eight or nine out of every ten recovering; the *prognosis* depends on the condition of the system generally; on the condition of the pulse (a strong pulse being favorable); also depends on the appetite (animals with a fairly good appetite generally recover; whereas, the total refusal of food usually means death).

The *prognosis* also depends on the heart-clot forming, and on a dilatation of the right side of the heart, or death may occur from gradual heart failure.

The amount of lung tissue involved does not aid in the prognosis, except in cases of double pneumonia, where they are apt to die from direct interference with the respiration; three-fourths of one lung may be involved, and they recover. On the other hand, one-fourth may be involved, and they die.

Œdema may cause death as well as other complications.

Outline the treatment of acute lobar pneumonia.

We should remember that this is a *self-limited disease,* which runs its course and is not materially affected by the use of drugs; we must try to assist nature in these cases.

Many cases get well without treatment, and probably other cases die from too much treatment.

There is *no specific treatment,* so we should be careful not to use too much medicine; treat the symptoms as they arise, and watch the fever and the heart.

In the early stages, if the animal be young and plethoric, use sedatives, as aconite, or veratrum, or tartar emetic; these drugs lessen the number of pulsations; diminish the arterial tension and vascular excitement, and reduce the fevers caused by inflammation.

In city practice we use very little sedative treatment; there is no set rule to go by, except the individual case, the condition of the heart and the temperature being the best guides. Sedatives are only indicated in the first stages.

Stimulants are usually given during the second stage, as ammonium carbonate and alcohol, etc.

Care should be used about giving too much stimulation; stimulants do not give strength (in the way supposed by many), but they lessen vital force; they tide the patient over certain dangerous periods, and for this reason do good.

If much debility is present, with a loss of appetite, nux vomica, belladonna, quinine, and pepsin are beneficial.

For the temperature: If the temperature be 104° or 105° F., we should not be alarmed, as the nature of the disease requires a certain amount of fever; but if the temperature be 106° F. or over, we should try to reduce it a degree or two.

An important part of the treatment is the *watching of the heart.*

The danger is a dilatation of the right side of the heart, with the formation of heart-clots and death in this way. Prevent heart-clots by giving more power to that organ and putting the blood in such a condition as to lessen its coagulating power.

Alcohol is probably the best stimulant we have, and is indicated where there is a small, weak, and feeble pulse.

Give a good dose and repeat every three, four, or five hours (day and night), according to the indications. A convenient way to administer the alcohol is in the drinking-water; two ounces in a pail or part of a pail of water. When there is no attendant at night, place a full pail in the horse's manger, so that stimulation can be kept up.

The increase of the fever and symptoms toward evening causes restlessness which is followed by exhaustion after midnight, and thus stimulation is important at this time to prevent cardiac failure.

The vitality is lowest between 2 and 6 A.M., and highest between 8 and 12 A.M.

Diffusible stimulants assist in preventing heart-clots.

Digitalis is good where the heart is irregular and weak, but has to be used with care and its action watched.

Cimicifuga can be used in some cases in the place of digitalis.

Strophanthus is also a drug indicated in some cases.

Strychnine or nux vomica is also good as a heart tonic, and can be given with strophanthus.

In cases of sudden heart failure, about the time of crisis, ether, hypodermically, or the use of ammonia—the aromatic spirits of ammonia or carbonate of ammonia.

Nitroglycerine, given where carbonate of ammonia seems to fail; good neurotic, beginning small doses.

Camphor is good in these cases; it adds rapidity and force to the heart's action.

If the cough be distressing, opium may be given in an electuary.

Muriate of iron, where low temperature, weak heart; add digitalis.

Drink.—The animal should receive drinking-water four, five, or six times a day, receiving small quantities at a time.

If the heart is weak and the animal is not feeding well, give whiskey or alcohol in the drinking water, or with a syringe, about every four hours. This is especially indicated from 11 P.M. to 2 A.M., when the vital forces are lowest.

Potassium nitrate may be added to the water, or, if indicated, five or ten grains of tartar emetic.

The Diet.—This is very important, as by the way the animal eats we are enabled to give a fair prognosis.

Examine the manger yourself; have it washed out while you are there.

Take a clean pail and let the man make a mash, adding a pinch of salt, and see how the animal eats.

Give small quantities at a time, and feed four or five times a day. If it won't eat bran, add a few oats, making layers.

Steamed oats may be given, if the animal won't eat anything else.

Grass, carrots, apples, and the like.

Coax the animal to eat, as upon its eating depends, to a great extent, the successful issue of the disease.

Local treatment.

During the stage of congestion, especially in city practice where horses are overworked and their heart is weak, strong English mustard (mixed with water to make a paste) can be well rubbed in over the affected lung and then covered with a sheet of paper. Tie the animal up for about two hours, after which he should be placed in a box stall, blanketed and legs bandaged. Give good fresh air but do not allow drafts.

If mustard is not used an oil-silk jacket is beneficial in some cases; or where this is not available cotton batten covering the sides held in place with a wide bandage may prove useful.

The animal should not receive forced exercise under two weeks as a rule, on account of weakening the heart.

LOBULAR PNEUMONIA.

Give the synonyms.

Broncho-pneumonia; pneumonia lobularis; it is sometimes called catarrhal pneumonia.

Define lobular pneumonia.

It is essentially an inflammation of the terminal bronchi and the air-cells which make up a pulmonary lobule, and thus the name *broncho-pneumonia.*

What is the ætiology?

It is secondary in the great majority of cases. It may be seen in cases of purpura hæmorrhagica, glanders, pyæmia, and the like.

It may arise from emboli in the capillaries of the pulmonary artery; these emboli are formed from thrombi which break up and get in the circulation of the capillaries of the pulmonary artery and block them up and stop the circulation.

Give the morbid anatomy.

The pathology is about the same as lobar pneumonia, except that the lobular structure is involved in this disease, whereas, in lobar pneumonia, the lobes are affected.

It seems to be restricted to certain spots or patches of consolidation.

What are the symptoms?

Most cases show symptoms of *acute bronchitis,* and, by extension, involve the air-cells of the lobules; the temperature rises; the

respirations become accelerated; a cough, which is short and painful, is present; the disease is usually slow in its course, and may result in pulmonary emphysema or in death, either from œdema or an extension of the processes.

How is the diagnosis made?

There is, ON PERCUSSION, *dullness in patches over both lungs (bilateral disease)*.

This condition is principally seen in the horse on post mortem.

Give the indications for treatment.

Tonics and stimulants are useful, not forgetting to watch the heart. Give alcohol, digitalis, chloride of ammonium, etc.

Treat as the symptoms require.

CHRONIC INTERSTITIAL PNEUMONIA.

What are the synonyms?

Cirrhosis of the lung; chronic pneumonia.

Give the definition.

This is a chronic inflammation of the connective tissue of the lungs, characterized by an increase of this tissue, which compresses the tissue proper and interferes with its normal functions.

What is the pathology?

This is more frequently seen in cattle than in the equine race; when seen, it is usually unilateral, the affected side being somewhat sunken.

If the chest cavity be opened, the heart will be found drawn toward the affected side; the lung not affected becomes emphysematous and enlarged.

Give the ætiology.

It may follow acute pneumonia, or pleurisy with effusion, which causes compression of the lung.

It may follow chronic bronchitis, with dilatation or emphysema.

What are the symptoms?

These vary according to the complication.

After the symptoms of pneumonia, etc., have subsided, dulness on percussion remains; there is a loss of the respiratory mur-

mur, or, if bronchial dilatation is present, there is cavernous or amphoric respiration.

The affected side is sunken, and not so movable.

Cough is present, and there is some interference with the breathing on exertion.

Indicate the treatment.

Look after the general health of the animal; give tonics and absorbents, the iodide of potassium being the best.

Good food, moderate exercise or work, and fresh air.

PULMONARY EMPHYSEMA.

Name the synonyms.

Emphysema, heaves, broken wind, chronic dyspnœa.

Define pulmonary emphysema.

This is a *chronic, non-febrile,* pulmonary disease, with either a dilatation or rupture of the vesicular structure of the lungs, and characterized by a *dry abortive cough and a double expiratory act.*

Give the forms.

There are two principal forms—the *vesicular* and the *interlobular.*

What is the difference?

The *vesicular* form is a simple dilatation of the alveoli and lobules, with atrophy of the interalveolar walls, while the *intervesicular* or *interstitial* form is a rupture of the walls of the air-cells, and the air escapes into the connective tissue which binds the air-cells together. There is an increased intralobular pressure, causing air to gain entrance into the interlobular connective tissue and into the lymphatic spaces.

What is the ætiology?

In the human subject, violent efforts at coughing, where the bronchial tubes are filled with mucus.

Men who play wind instruments or do heavy lifting suffer with emphysema.

In the horse, rapid work, heavy draft work, may be a cause.

There is also a hereditary predisposition, there being a weakness in the walls of the air-cells.

An animal driven for some distance at the top of his speed (he being a willing horse) will overdo himself, and the residual air has a tendency to dilate the air-cells.

If drawing a heavy load, more muscular work must be performed; this causes a deep inspiration and a closure of the glottis, and the air becomes heated and dilates and stretches the walls of the air-cells.

Coughing may cause it also, but it takes some time to produce it in this way.

The feeding of dusty or dirty hay or bulky food is also said to produce it; in the country they often feed dry hay, straw, cornstalks during the winter, and in the spring the horse may be heavy.

It may follow pneumonia, pleurisy, etc.

What are the post-mortem appearances?

On opening the thorax, a striking difference in the appearance of the lungs is seen; instead of collapsing, as they do normally, the lungs remain full, and even, in severe cases, may bulge up, as if they were being inflated; they are soft and downy to the feel, of a rosy tint, but lighter than normal; they do not contain so much blood.

On palpation they have a good deal of resistance, and pit somewhat on pressure; they are very light, and if a piece be cut off it will float on water; it crepitates when cut. In the anterior, middle, and posterior borders, the air-cells are enlarged.

If it is the interlobular variety of emphysema, elevations which contain air can be seen over the surface of the lungs; these elevations are often white, and old practitioners thought they were tubercles; if cut, they contain air, press on them, and the air will run under the pleura.

What are the symptoms?

These are very interesting for us, especially in cases of *examination for soundness*, as such horses are *to be considered unsound.*

The disease comes on slowly or suddenly. The derangement occurs in the mechanism of the respiratory movements which can often be detected by simple inspection of the abdominal walls in the region of the flank. The alteration is principally in the expiratory movements. *Normally*, there is *an inspiration, an expiration, and* then a *pause;* in this disease, during the expiration (falling in of the hypochondriac region, hollowing of the upper part of the flank), there is a short pause and a secondary expiratory move-

ment. There is a well-marked line or groove produced by the muscles along the abdomen.

The *double,* or the two movements in the *expiratory act,* is not pathognomonic of heaves, as it may be seen in cases of pleurisy as well as in a rupture of the diaphragm and hernia of the intestines preceding death.

Inspiration is different; the ribs are elevated more; they seem to turn on their axis; the posterior border of the ribs turns upward and outward; at the end of expiration there is a jump of the abdominal cavity in some cases; it is a peculiar jerky movement, a falling back of the intestines; this movement may be so severe as to cause a movement of the animal; if the animal be hitched to a cart, the cart moves.

In severe cases there is a dilatation of the nostrils, which keep open and do not recede; on a frosty day the column of air is divided, or in the summer-time by placing the hand to the nostril you can feel the interrupted volume.

In other cases there is a well-marked play of the anus; the anus goes back and forward; this is not pathognomonic, as it is also seen in pleurisy.

There is also the symptom of breaking wind, a discharge of flatus from the intestines; in some cases, when the animal coughs, it is a dry and abortive cough; as a rule, it is single, dry, smothered, and abortive.

When eating dusty food, as hay and the like, they often have a fit of coughing. If associated with chronic bronchitis, a discharge is often present, which is whitish in color.

On percussion, we have extra resonance or hyper-resonance; in some cases we cannot percuss to any advantage in this disease, as the edges of the lungs are affected.

On auscultation, we find the inspiration very short; the expiration is of longer duration and interrupted, and, on listening, we hear undetermined sounds; as a rule, we hear dry or moist râles, and varying according to whether bronchitis is present or not.

How is the disease diagnosed?

It ought to be easily made out, as the disease is *non-febrile;* the *cough,* which is single, dry, and abortive; the to-and-fro movement of the anus, and the breaking of wind.

On inspiration, we find the chest somewhat enlarged, while the *expiratory act* is double.

Absence of signs of pneumonia, pleurisy and bronchitis, which are febrile affections.

What is the treatment?

It is *incurable* in the majority of cases, but many animals are benefited very much by special feeding, and by medicinal agents.

First we usually give a dose of physic—a purging-ball of aloes; these animals suffer with indigestion, flatulence, catarrh of the intestines, and the like, and a purge gets rid of this indigestible food.

By careful attention to the diet we may lessen the symptoms.

When it is due to dry, dusty hay, limit the quantity of hay and dampen it with water, or with salt-water.

In some cases wet the oats.

The medicinal remedy is arsenic. In Europe the people eat arsenic in order to enable them to climb the mountains better.

Arsenic prevents destruction and elimination of the oxygen carriers.

We use arsenic best in the shape of Fowler's Solution (liquor potassæ arsenitis), also called liquor potassii Fowleri; this consists of eighty grains of arsenic, eighty grains of potassium carbonate, and water to make a pint; one fluid ounce can be given as a dose, and this contains four (4) grains of arsenic. The dose of arsenious acid varies from two to seven grains.

Fowler's solution is colored with lavender to keep people from drinking it by mistake; give one ounce three times a day; this will often relieve some of the most urgent symptoms.

Nux vomica, iron, potassium iodide, are often beneficial, as are internal antiseptics and stomachics.

6. DISEASES OF THE PLEURA.

PLEURISY.

Give the synonyms.

Pleuritis; inflammation of the pleura.

Name the forms.

Acute, subacute, suppurative, interstitial.

Define the various forms.

Acute or plastic pleurisy is a fibrinous inflammation of the pleura, and is the form mostly seen in the dog.

Subacute, or pleurisy with effusion, also called sero-fibrinous, in an inflammatory process with a large amount of serum. This is the form most frequently seen in the horse.

Suppurative pleurisy, or *empyæma,* is where pus-cells are formed.

Interstitial, or adhesive pleurisy, or chronic pleurisy, is where new connective-tissue formations take place.

What is the ætiology?

Pleurisy is not infrequently met with in the young green horses, in the dealers' stables. The dealers probably lose more from pleurisy than any other disease—that is, as complications from other diseases.

Pleurisy is one of the most fatal diseases affecting the equine race.

It arises from traumatic injuries, a wound penetrating the muscles in the intercostal spaces, or it may be secondary to other diseases, as pneumonia, when it is called *pleuro-pneumonia,* or pneumonia complicated with pleurisy.

It may accompany blood diseases, as glanders, or it is often *epizoötic* where influenza is prevailing in some of its forms.

It may also be caused by foreign bodies in the pleural sac, blood, pus, or air in the sac, or, again, necrosis of the ribs or vertebræ.

Inflammation of these structures, with a secondary pleurisy in some cases.

Changes in the atmosphere often aid to cause pleurisy. It is more generally a secondary disease; the animal may be suffering with a laryngitis, and you think he will get well; but the fever keeps high, and after a time subacute pleurisy is developed.

Nowadays it is said to be caused by *micro-organisms.*

What is the pathological anatomy of pleurisy?

The course of an inflammation of a serous membrane is—hyperæmia, followed by exudation of lymph, the effusion of fluid, its absorption, and the adhesion of the membrane. For study, pleurisy may be divided into three stages.

The first stage, or *dry stage,* or *stage of engorgement* or *congestion.* There is an irregular redness of the membrane, with little specks of exudation, called coagulable lymph; this can be produced by an injection of oxalic acid. At first the membrane is dry, red-

dened, with an increased network of engorged vessel; it loses its shining appearance and becomes opaque, from the shedding of the epithelium and the commencing exudation.

The second stage is characterized by the copious exudation of lymph (more or less covering the membrane, giving it a dull, cloudy, or shaggy appearance) from the clumps of fibrine; if the inflammation ceases at this point, it is called dry pleurisy. The amount of exudation depends on the amount of inflammation. When the inflammatory process is acute, the exudation consists most entirely of fibrine factors, which coagulate; often these layers of fibrine can be seen covering the sides of the pleural cavity, both on the visceral and the parietal layers.

The fibrine is a thick, yellowish material, deposited in layers, patches, or shreds, according to the amount, causing the membrane to become very much thickened; it is infiltrated with serum and some leucocytes, it rarely being puriform. In the milder forms of inflammation of the pleura, serum is poured out. The albuminous part of the blood and serum is transuded and has a tendency to gravitate to the bottom, and often fills up the sac.

The stage of effusion is characterized by the pouring out of a semi-fibrinous liquid; more or less filling the cavity and floating in this fluid are flocculi of fibrine, blood, and epithelial cells.

The *exudation* is called *serous, fibrinous,* or *fibrino-serous.*

In the third stage this material may undergo fatty degeneration and become absorbed, in which case resolution takes place; or, on the other hand, it may become organized and form false membranes. In the human subject we often find the lungs attached to the walls of the thoracic cavity, in which case it becomes necessary to cut these adhesions to remove the lungs; this is rarely found in the equine, but is quite common in the dog.

The serous part of the exudation may become absorbed by the blood-vessels and the lymphatics; the character of the inflammation we generally see in the horse is the subacute form, which contains more serum than fibrine, and therefore so dangerous on account of drowning out the lungs, as we say, and the animal dies from exhaustion.

Is this a unilateral or a bilateral disease?

This is somewhat of a disputed point.

On post-mortem examination we find the fluid in both cavities. This is claimed to be a peculiarity—that is, there is a connection

between the two pleural cavities—a perforation of the mediastinal pleura.

Some say that this perforation is made after death.

There are, no doubt, openings between the two pleural cavities, and thus it is termed a *bilateral disease,* although, primarily, one pleura only may be affected. As the effusion is thrown out it accumulates in both cavities, and thus the bilateral physical signs.

What are the symptoms?

At times the symptoms are vague, and, while treating laryngitis and the like, this disease may be developing and we may overlook it. It very often is associated with or follows pneumonia.

In other cases the symptoms are striking; it commences with a chill, the animal becoming dull, the hair roughened, muscular tremblings, coldness of the extremities and skin, followed by febrile symptoms; the hair falls down, the body becomes warm, and the mucous membrane injected.

The *pulse* in pleurisy is small, quick, and hard—a so-called wiry pulse, which is characteristic of inflammations of serous membrane; later it becomes softer and weaker.

The *temperature,* in the early stages, may rise to 104°, 105° or 106° F., but after the effusion has taken place the temperature falls and is often very low; one day it may be 101° F., the next day 102° F., and then fall, varying one or two degrees, from about 103°, 102°, 101° F.

The *respirations* become quickened and catching at first, and are abdominal.

After the exudation takes place the expiratory act becomes double.

There is the so-called *pleuritic grunt,* which is evinced on moving the animal or turning him short.

The animal moves as though he were of one piece, as motion produces lancinating pain, shown by this grunt.

After the exudation is thrown out, there is a peculiar sound heard at the nostrils, which is called the *metallic tinkling sound.*

A *cough* may be present, which is short, dry, tearing, and suppressed; one of the most annoying symptoms is the loss of appetite.

As the effusion accumulates the respirations become more difficult, the double expiratory act more marked, the pulse becomes rapid and weak, and the animal dies from exhaustion.

Give the physical signs.

Inspection.—First Stage.—There are catching respirations, which are abdominal, with the body bent to one side.

Second Stage.—Double expiratory act, while in third stage the walls of the flank heave.

Percussion.—First Stage.—At first there is not much change, there usually being resonance.

Second Stage.—When the exudation and effusion take place there is an alteration; not dulness, as in pneumonia, but *flatness,* on account of it being a liquid; the line of flatness is uniform, it being on a straight line (horizontal), as liquids seek a level; above this line there is resonance and below it flatness.

Third Stage.—As the fluid is becoming absorbed the *flatness decreases.*

Auscultation.—First Stage.—There is a roughness of the pleura, and the rubbing of the roughened surfaces together produces a *dry friction sound,* which resembles the rubbing of two pieces of parchment together.

It is called the *pleuritic friction sound,* and is heard on inspiration and expiration.

Second Stage.—There is an *absence of all respiratory sound* at the affected part. Bronchial breathing above the line of the trouble. The *mucous click,* or *the metallic tinkling sound,* can be heard above the line of fluid or at the nostrils. It sounds like a pin dropping in a metallic vessel, or a drop of water going through the mouth of an open bottle. It was formerly supposed to be pathognomonic of pleurisy, but it may be heard in laryngitis.

Third Stage.—The *pleuric friction sound* returning (a rubbing and sticking sound), and the metallic tinkling sound getting less and less as the fluid becomes absorbed.

How is pleurisy diagnosed?

The pulse assumes a wiry character; the respirations are abdominal, with a double expiratory act; the temperature at first 104° to 106° F., then oscillating between 103° and 101° F.

Flatness on percussion in the second stage; on auscultation during the first stage, *the pleuritic friction sound* heard on inspiration and expiration, while, during the second stage, there is an

absence of all respiratory sound below and bronchial breathing above.

During the third stage the returning of the pleuritic friction sound.

What diseases may be mistaken for pleurisy?

Pneumonia and bronchitis, principally.

What is the differential diagnosis between pleurisy and pneumonia?

Pleurisy is a bilateral disease, while *pneumonia,* in ninety-nine cases out of one hundred, is unilateral.

Pleurisy, temperature is high at the beginning, but later 103° to 101° F., while in *pneumonia* the temperature is high all through —104° to 106° F.

In the *first stage* of *pleurisy,* ON AUSCULTATION, the pleuritic friction sound is heard, while in *pneumonia* the crepitant râle.

In the *second stage* of *pleurisy* there is flatness ON PERCUSSION over the fluid, limited above by a horizontal line on both sides of the chest, whereas, in *pneumonia,* dulness over the affected part, limited by an uneven line (generally one side).

Give the differential diagnosis between pleurisy and bronchitis.

In pleurisy the temperature is high at onset, then lower, while *in bronchitis* the temperature is usually high; in *pleurisy,* on percussion, second stage, flatness; while *bronchitis*—percussion—resonance is obtained.

In pleurisy, the pleuritic grunt; *in bronchitis,* sibilant and sonorous râles during the first stage. *In pleurisy,* loss of all respiratory sound (second stage); *in bronchitis,* mucous râles coming and going (second stage).

The prognosis.

It is most always grave, the animal usually dying from *asthenia.*

As a rule, where there is a good deal of fibrine thrown out the animals get better.

If they eat well, and the fever is not too high in the beginning, and the heart is strong, the prognosis is more favorable.

The treatment of pleurisy.

The indications are to get rid of *the pain* in the beginning and the *effusion* in the second stage. At the onset, anodynes and sedatives are indicated; morphine with aconite is often beneficial. If, on the other hand, the animal is very weak, stimulants are recommended.

To get rid of the effusion, purgatives should not be used, so that we should call on the kidneys to act; nitrate of potassium in half or ounce doses; iodide of potassium is good as a diuretic and absorbent, but, as this interferes with the appetite in some cases, it should not be used too long. Salicylate of soda, colchicum seed, and digitalis are good.

Nux vomica and arsenic are often beneficial; quinine with pepsine, for the appetite. Whiskey should be given if indicated.

The local treatment.

Counter-irritation, as mustard, is good, as is also the oil-silk jacket.

At times we have to use the fly blister or part fly and part red iodide of mercury or tartar emetic, one drachm to the ounce of blister. This is not likely to blemish.

Clip off the hair and apply it. In some cases suppuration takes place, the skin falls off, and the animal is marked for life, but this is better than a fatal termination. It is better not to blemish, if possible.

Tapping the chest (*paracentesis thoracis*) is occasionally used, but with unsatisfactory results. About the eighth or ninth intercostal space, midway between the level of the sternum and the level of the fluid is the point to introduce the trocar and canula, or, better, an aspirator.

The diet and means of keeping up the appetite are very important.

Coax the animal to eat: give him gruel, grass, apples, and the like if he will not eat bran or steamed oats.

EMPYÆMA.

Give the synonym.

Purulent pleurisy.

What is empyæma?

This is *pus* in the pleural cavity.

Although quite common in man, it is more or less rare in

animals. It may occur from injuries to the chest cavity involving the pleura.

HYDROTHORAX.

What is understood by hydrothorax?

This may be defined to be *water* or *serum* in the pleural cavity.

It is somewhat rare in equines, it being more frequent in the sheep and the dog; it is a non-febrile disease, with about the same physical signs as in the second stage of pleurisy.

Dyspnœa is the principal symptom.

What is the treatment?

Build up the system. Give diuretics, diaphoretics, and absorbents. Stimulants may be indicated.

Locally, blisters may be beneficial.

PNEUMOTHORAX.

Give the definition and causes of pneumothorax.

It is an accumulation of *air* in the pleural cavity, due, usually, to penetrating wound—broken rib or abscess breaking internally and externally.

Where gangrene of the lungs takes place, or where air-cells rupture in pulmonary emphysema, these cases are diagnosed by aspiration.

Dyspnœa, temperature low, and signs of collapse.

What is pneumo-hydrothorax?

This is a condition with *air* or *gas* and *liquid* in thoracic cavity.

Define pyo-pneumo-hydrothorax.

This is a condition with *pus, air,* and *liquid* in pleural cavity.

What is meant by hæmato-pneumothorax?

This is a condition with *blood* and *air* in thoracic cavity.

What is understood by the term pneumo-nokoniosis?

This is a term used to denote diseases of the lungs due to the inhalation of particles of dust, causing a discoloration of the lungs.

Horses used near mines breathe in coal-dust, or stone-dust, or metallic dust.

SECTION V.

DISEASES OF THE DIGESTIVE SYSTEM.

1. DISEASES OF THE MOUTH AND PHARYNX.

LAMPAS.

What is meant by lampas?

It is a swelling, or, in some cases, an inflammation of the mucous membrane of the hard palate.

The mucous membrane projects beyond the incisors and is probably only troublesome during dentition; as a rule, these cases, when brought to your notice, will reveal upon examination a deeper trouble, as laryngitis, bronchitis, pneumonia, etc. Or the swelling of the gums may be entirely dependent upon disordered digestion.

What can be done for this condition?

The old practice was to burn these with a red-hot iron. This would cause a slough, which would leave a wound, interfering more or less with the act of prehension. This sort of treatment should not be used under any consideration. The cause of the apparent benefits observed from burning the gums will be found in the fact that during the processes of sloughing and healing the animal will not eat well, and when the mouth gets well he is hungry and eats ravenously.

The horse does not chew with this part of the mouth, and therefore it requires little or no treatment. In these cases we have to treat the owner, and so ofttimes we scarify the gum lightly to please him, or give some mild astringent wash. If indigestion be the fault, treat to overcome that deranged function.

Probably the best way is to recommend corn on the cob, telling the owner that this will wear down the gums; another fact, showing that lampas does not amount to much, except during dentition, is that the animal will eat this hard corn off the cob.

PARROT MOUTH.

What is understood by parrot mouth?

This is where the upper jaw and incisors are long and overlap the lower. The incisors do not come together in the regular manner.

It is often difficult for these animals to prehend their food, especially if turned out to grass. If it be a pronounced case, feed on cut hay, etc., to make it easier to take hold of their food.

CRIBBING.

Give the synonym.

Crib-biting.

What is the definition?

By cribbing is understood a taking hold of or a gnawing of some substance (usually wood), and characterized by a wearing away or a bevelling of the front portions of the upper and lower incisors. The animal is called *a cribber.*

Give the causes.

It is a habit in many cases, and can be acquired by standing in the stable continually, and especially if near an animal that has this habit. It may be due to something wanting in the system, or to some digestive trouble.

What can be done for these animals?

There is no specific; keep the animal in a stall having no manger nor anything to get hold of, and work regularly.

Keep rock salt in the stall, unless this tends to increase the habit of cribbing.

WIND SUCKING.

What is meant by this?

The animal is known as *a wind sucker,* and may take hold of some hard substance with the incisor teeth, arch the neck, give a grunt, and apparently swallow air; or, in other cases, the nose is extended, the lips puckered, and the animal imbibes wind without taking hold of anything with the teeth.

Cribbing and *sucking wind* are usually associated, and are to be considered *an unsoundness.*

What is the treatment?

About the only treatment used is the application of a wide strap around the neck to keep the animal from arching the neck, but this is objectionable, as it may produce dilatation, etc., of the œsophagus, choking, narrowing of the trachea, etc.

IRREGULAR TEETH.

What irregularities of the molar teeth may be seen?

The molar teeth, on account of not having an equal wearing on the table, have sharp points or projections on the outside of the upper jaw and the inside of the lower jaw.

Give the treatment.

These roughened edges should be filed down or cut off.

Do not smooth the rest of the tooth, as it is natural for them to be roughened, so as to perform mastication properly.

STOMATITIS.

Give the synonym.

Commonly called bags.

Define the same.

It is an inflammation of the mucous membrane of the mouth, characterized principally by salivation.

What is morbid anatomy?

The mucous membrane of the mouth is reddened, swollen, and somewhat dry at first; soon secretion takes place, causing a moisture of the parts; the secretion, admixed with saliva, often flows from the mouth. The superficial form is the one mostly met with in the horse.

Give the causes.

It may be due to direct injuries, as a curb-bit, irregular teeth, irritating drenches, or irritating drugs, as the chewing of a ball of chloral hydrate. Food undergoing decomposition by locating in a decayed tooth. The action of microorganisms may also be a cause.

What are the symptoms?

Stomatitis interferes with prehension and mastication, and thus there is a loss of appetite, the mucous membrane becomes swollen,

as do the lips, ropy saliva escapes from the mouth, and there are the other clinical signs of inflammation.

Outline the treatment.

On account of the great number of blood-vessels in this region, little or no treatment is required.

Chlorate of potash is specific for mouth and throat inflammations; it can be given in an electuary or as a gargle, in which case it can be syringed into the mouth.

Some slight astringent wash, as a mild solution of argentum nitrate, may be indicated. In most cases potassium nitrate in the drinking-water is beneficial, as it is cooling.

In the horse, as a rule, this trouble is only superficial; the diet should consist mostly of soft, sloppy food.

GLOSSITIS.

What is glossitis?

It is an inflammation of the mucous membrane and substance of the tongue, characterized by an interference with the function of that organ.

Give the morbid anatomy.

The appearance of the tongue is about the same as found in stomatitis. In both of the inflammations, in the horse, we usually find merely a superficial condition, which readily subsides under proper treatment.

What are the causes?

It is caused by irritating medicines, wounds of the tongue, and the like, about the same as stomatitis, with which it is usually associated. It is often seen when the animal is turned out early in the spring, before the young grass is well up.

Give the symptoms:

They are about the same as stomatitis, except that the tongue often projects from the mouth, and the tip may be dark-colored.

Give the treatment of glossitis.

The use of non-irritating disinfectants, and about the same drugs as are used in stomatitis; solutions of alum, boric acid, potassium chlorate, zinc sulphate, etc.

APHTHÆ.

What is the synonym?

Thrush; in the human subject it is called muguet, or sprue.

Give the definition.

It is an inflammation of the mouth, due to the growth of a vegetable parasite called the *öidium albicans.*

What are the symptoms?

This affection occurs mostly in the young (*foals, calves, lambs, dogs,* etc.); the mucous membrane of the mouth becomes inflamed, small white spots are present, soon becoming vesicles, which rupture and leave excoriations.

What is the prognosis?

Good, as a rule.

Give the treatment.

Cleanliness and soft food are important; the use of mild astringent and antiseptic solutions is usually beneficial.

Any of the following drugs may be used, according to the case: Potassium chlorate, potassium permanganate, copper sulphate, alum, boric acid, silver nitrate, zinc sulphate.

PAROTITIS.

What is the synonym?

Parotiditis; in man it is called mumps.

Define parotitis.

It is an inflammation of the parotid gland, and characterized by fever and the local signs of inflammation.

What are the causes?

It is often due to germs; may be the result of an extension; mechanical injuries; exposure to atmospheric changes may aid in its development.

How is parotitis diagnosed?

By the swelling of the gland, by pain on pressure, by fever, in some cases difficulty of deglutition, and the deviation of the head to one side.

What is the treatment?

In simple cases, absorbing ointments, mild blisters, etc.

If suppuration is taking place, hot poultices, blisters; open the abscess when ready, taking the greatest of care.

Internally, cooling drinks, absorbents, internal antiseptics, etc., according to indications.

PHARYNGITIS.

Define pharyngitis.

It is an inflammation of the mucous membrane lining the pharynx, and characterized by more or less difficulty in deglutition.

Give the ætiology

It is usually associated with, or secondary to, laryngitis, it being as a rule an extension of the inflammation.

It may be caused by mechanical, chemical, or thermic irritation, and in some cases it may be of a contagious nature.

What are the symptoms?

The first symptom noticed, as a rule, is that the animal refuses to eat; he may make attempts, but is unable to swallow, as there is a difficulty in deglutition.

It is a febrile disease, but the temperature is not very high, being about 101° or 102° F.; there is no cough present, unless laryngitis is associated with it, or food, etc., irritates the parts.

One marked symptom is the *return of liquids through the nostrils.* If you give the animal a pail filled with water, he takes a few swallows, stops, and the water is regurgitated through the nostrils.

There is an inability to swallow, and often solid material and mucus or pus are returned through the nostrils.

How is the diagnosis made?

By the *slight fever,* the *inability to swallow* (especially liquids); by the *absence of much pain on pressure* over that region.

Give the differential diagnosis between pharyngitis and laryngitis.

In *pharyngitis* the temperature is lower than in *laryngitis;* pain is slight or wanting in *pharyngitis,* whereas it is very pronounced on pressure in *laryngitis.* In *pharyngitis* there is difficulty in swallowing liquids, while in *laryngitis* liquids are more easily taken.

Give the prognosis.

The *prognosis* is not, as a rule, grave, though the animal may die from starvation, paralysis, or œdema of the glottis.

What is the treatment?

Blisters over the region of the parotid glands and the pharynx, the use of gargles, or spraying or swabbing out the throat with a solution of nitrate of silver or peroxide of hydrogen, or anodyne or astringent electuaries may be used.

As a rule, we cannot give solid medicines in these cases, on account of the inability to swallow, and for the same reason never give drenches.

If we could get at the pharynx, as they do in the human subject, we might do better with these cases.

Chlorate of potassium in the drinking-water will be of great service; even though little is swallowed the animal attempts to do so, and this cooling solution is brought into direct contact with the inflamed surface.

It is well to isolate the animals; use separate pail to water them, and clean and disinfect the manger.

Enemas may be beneficial to unload the bowels.

PARALYSIS OF THE PHARYNX.

Give the definition.

This is an absence of power of the muscles of the pharynx, characterized by a total loss of the power of deglutition.

What are the causes?

It is often difficult or impossible to attribute any cause. It may follow pharyngitis; it is present in cerebro-spinal meningitis.

Give the symptoms.

Inability to swallow food or drink. Saliva and food flowing from the nostrils and mouth.

Palpation yields a baggy condition of the fauces; when the parts are touched there is no contraction, the reflex action having disappeared.

What is the prognosis?

Grave, these cases dying in four to six days from heart exhaustion or starvation.

Outline the indications for treatment.

Internally, belladonna, strychnine, etc.

Locally, blisters over the pharynx; astringent and antiseptic solutions applied to the pharynx itself.

POST-PHARYNGEAL ABSCESS.

Give the synonym.

Super-pharyngeal abscess.

What is the definition?

This is a term borrowed from the human, and signifies a collection of *pus* in the cellular tissue behind or above the pharynx.

It is rarely seen, although it may occur, and when it is present you are apt to be misled, as the only symptom present is roaring.

After a time the abscess breaks, pus escapes from the nose, and the symptom subsides.

What are the indications for treatment?

Williams recommends puncturing, but it is often difficult, unless the abscess points and bulges. If so, treat as you would any abscess. If a diagnosis can be made the exploring needle should be employed to confirm it, when it may be opened by boring with the finger or by the use of the aspirator.

INFLAMMATION OF THE GUTTURAL POUCHES.

Give the synonym.

Pus in the guttural pouches.

Define the same.

This is a catarrhal inflammation of the mucous membrane of the guttural pouches, with the formation and accumulation of pus, and characterized by a discharge from the nostrils at varying intervals, especially if the head be depressed.

Describe the use of the guttural pouches.

The use is not well understood; the sense of hearing is supposed to be aided by them.

The pouches are found in the equine race, and are lined by mucous membrane. The opening of the Eustachian tube is high up.

What is the pathology?

The mucous membrane becomes tumefied, reddened, and infiltrated; an increased amount of secretion takes place, which becomes purulent and glairy, holding white or yellowish-white clots in suspension.

The watery parts may become absorbed or evaporated, the remainder undergoing degeneration and becoming absorbed, or may dry up and form calculi, which are variable in size, from a pinhead to a chestnut.

Gas is sometimes present in these pouches.

The neighboring lymphatic glands are hard and somewhat enlarged.

Give the causation and symptoms.

The inflammation is generally secondary, often following or associated with parotitis, pharyngitis, or colt distemper.

The Eustachian tube may become closed, preventing the escape of pus, which accumulates (generally on one side, becoming much swollen, causing difficult breathing (dyspnœa) and even roaring, and also interfering with deglutition by pressure on the larynx and pharynx).

It may become so distended as to burst or cause death by suffocation or gangrene of the lungs.

In other cases the pus escapes from the nostrils—either one or both; if unilateral, the veterinarian looks for glanders.

The discharge is intermittent in character, and depends on the position of the head, it being increased when the head is lowered. Mastication and deglutition often increase the flow, as will exercise.

The intermaxillary glands are swollen in most cases, and are usually soft to the feel and movable under the skin.

The discharge varies in quality, generally being of a thick and creamy consistency and odorless. It comes out of the most depending part of the nostril, and does not form crusts, and is not very sticky.

If we suspect this condition, we look at the parotid region, and there we find a swelling which, if pressed on, is painful and often causes the pus to flow out.

How is the diagnosis made?

By a thick, odorless, creamy, and clotty discharge from one or both nostrils, being intermittent, and increased by mastication, deg-

lutition, position of head or exercise, and by the swelling in the parotid region.

How may it be differentiated from pus in the sinuses?

By swelling over the sinus, by dulness on percussion associated with pain, and by the discharge, which is usually offensive.

Give the prognosis.

The case seems to hang on unless treated, and is quite a grave condition. Death may result from asphyxia or gangrenous pneumonia.

What are the indications for treatment when pus is present?

This is rather difficult to treat, and when it attends colt distemper it may have to be opened on account of the interference with the respiration. Be careful when opening, on account of the blood-vessels in that region. Cut through the skin with a scalpel, and then, by the use of a trocar and canula, the cavity containing pus may be found. Then, by the use of a blunt-pointed bistoury and your finger, carefully enlarge the opening until you reach the cavity. Now wash out the cavity with mild disinfectant solution.

By using your finger in these cases you avoid much hemorrhage.

An operation is often performed called *hyovertebrotomy,* which is one of the most delicate operations we have to perform. Roughly speaking, it consists in making an incision above and one below, and passing a seton through.

These animals should receive their hay off the floor, so as to keep their heads in a low position, which allows the pus a better chance to escape. It is well to turn these animals out to grass. Exercise is also beneficial.

Keep manger clean and disinfected.

2. DISEASES OF THE ŒSOPHAGUS.

FOREIGN BODIES IN THE ŒSOPHAGUS.

Choking.

What is the causation?

Food, as carrots, apples, potatoes, bread, and the like, that have not been properly masticated, or foods that are not properly in-

salivated, in such cases being hard and becoming lodged; pills that are large, hard, and dry; then, too, stricture, tumors, etc., may cause this condition.

What may be the situation of the foreign body?

It may be situated *in the pharyngeal part, in the cervical portion, or in the thoracic portion.* In the horse the principal situation is the cervical part.

What are the symptoms when the foreign body is situated in the pharyngeal portion?

The symptoms are urgent, there is a spasmodic contraction of the muscles of the neck, with arching of the neck, and efforts at swallowing and regurgitation.

Often dyspnœa is present; animal becomes uneasy and distressed.

Salivation takes place, consisting of a thick and ropy material, which denotes irritation of the glands of the fauces.

In the fauces there are a great number of mucous glands, and these pour out their secretions.

We can often detect a swelling in the region of the pharynx; or, if we pass our hand back in the mouth, the foreign body may be felt.

Give the symptoms when the body is situated in the cervical portion.

If the foreign body is situated *in the cervical portion* the symptoms are not so urgent, and in these cases we test by liquids, the water going down as far as the obstruction, and then returning through the nares and the mouth.

Again, in some cases a marked prominence along the œsophagus may be seen.

What are the symptoms when the body is situated in the thoracic portion?

When in the thoracic portion the symptoms are often very obscure; the animal will not eat much, and when he does eat or drink there is a regurgitation and a discharge through the nostrils and mouth.

Outline the treatment.

The indication is to get rid of the body; manipulations externally; or if it be in the pharynx, manipulations internally. If the

object be further down, administer oil to lubricate the passage as well as the object.

If the body be in the thoracic portion, use the probang, which, in the horse, is difficult, as we cannot get its head on a straight line with the throat, and so cannot use a very large probang. When using the probang, don't use violence, but gentle, continued pressure.

If the object cannot be removed with a probang, *œsophagotomy* can be performed. This is not very difficult; you cut down on the œsophagus, expose it, make your incision above. There is some trouble in healing, and danger of a constriction. In applying sutures, be sure and have the mucous membrane included.

STRICTURE OF THE ŒSOPHAGUS.

Name the synonym.

Strictura.

Give the definition.

This is a contraction, constriction, or narrowing of some portion of the œsophagus, characterized by more or less severe symptoms of choke.

What is the ætiology?

It may be produced by a wound, or by morbid deposits, as tumors pressing on the œsophagus; also, cancer of the œsophagus, or by parasites.

There is usually a dilatation above the stricture, which can be seen when the animal drinks.

How is the diagnosis made?

It is made principally *by regurgitation of food and drink*, and in some cases by the passing of a probang.

What is the treatment?

Some books recommend cutting down, but this depends very largely on the extent and cause of the stricture; if the stricture is slight, careful feeding is all that can be recommended. If severe, destruction of the animal is advisable.

DILATATION OF THE ŒSOPHAGUS.

What is the synonym?

Jabot.

Define a jabot.

By a jabot is meant *a saccular dilatation* or a *hernia* of the œsophagus. In other cases the dilatation may be more or less general.

What are the symptoms?

There is an altered appetite, difficulty of deglutition, signs of choking, more or less severe, salivation, regurgitation of food and drink, emaciation, which is more or less gradual.

Locally, on the left side, generally in front of the shoulder, a tumor appears, which is soft to the feel, compressible, and reducible on pressure. After eating or drinking the tumor becomes larger, on account of containing food.

With what condition may a jabot be confounded?

With a cold abscess, when situated on the left side.

How are these to be differentiated?

By the jabot being soft and reducible, while *the cold abscess* is hard, the walls thick, and, if aspirated, will be found to contain pus, if it has had time to form.

What is the prognosis?

Dilatation is usually associated with *stricture*, the former being above the stricture.

What is the treatment?

There is nothing much to do in these cases; some recommend cutting down, etc., and in some cases may get good results.

Pressure may be of some service.

RUPTURE OF THE ŒSOPHAGUS.

Name the synonym.

Perforation of the gullet.

What are the causes?

The lodgement of foreign bodies, punctured wounds, or from the result of operations; it may be associated with certain brain affections.

Give the symptoms.

Symptoms of choking are present; after eating and drinking, a large swelling, due to the food and water, may be shown externally. The food and drink are often regurgitated through the nose.

What is the treatment?

No treatment, except where the wound is slight, in which case treat it as you would any wound; cleanliness, astringent and antiseptic solutions. If sutures are employed be sure to include the mucous membrane.

PARALYSIS OF THE ŒSOPHAGUS.

What is the synonym?

Paralytic dysphagia.

Define this affection.

This is a loss of power of the muscular structure of the œsophagus, characterized by an inability to contract.

SPASM OF THE ŒSOPHAGUS.

Name the synonyms.

Œsophagism; dysphagia spastica.

Give the causes.

Often due to some foreign body or nerve irritation.

What are the symptoms?

Arching of the neck, retching, and attempts at vomiting; profuse salivation is present in some cases.

Outline the treatment.

Antispasmodics, as belladonna, opium, etc., may be given, together with flaxseed-tea or oils.

ŒSOPHAGITIS.

Give the definition.

This is an inflammation of the mucous membrane, etc., of the œsophagus.

What is the causation?

It may be slight, accompanying pharyngitis, or it may be caused by parasites.

Irritants, as a chloral pill breaking, or when given in capsule in tympanitic colic, the distended stomach refusing to admit the capsule, which dissolves and liberates the irritant; it may be caused by caustics; also by very hot drinks or drenches.

The diagnosis is made how?

Is often difficult in mild cases, as the symptoms are often vague. There is pain on pressure, difficulty of swallowing, salivation, and some of the symptoms of choking, arching of the neck, retching, squaling, etc.

What is the treatment?

Cooling and mucilaginous drinks are beneficial; allow animal to lick ice; astringents, as a solution of alum, or chlorate of potash, silver nitrate, tannin, etc.

The diet should be liquid and non-irritating.

3. DISEASES OF THE STOMACH.

GASTRITIS.

Name the forms of gastritis.

Gastritis may be conveniently divided into three forms, namely, Toxic Gastritis, Acute Gastritis, and Chronic Gastritis.

TOXIC GASTRITIS.

What is the synonym?

Poisonous gastritis.

Define this form.

This is an *acute* and *violent* inflammation of the mucous membrane of the stomach with loss of tissue.

What is the pathology?

The mucous membrane is reddened, swollen, and eroded in spots or patches; the ulcerations which are present may be superficial or deep; the gastric glands are destroyed.

The mucous membrane of the mouth, etc., may show signs of inflammation.

Give the ætiology.

Irritants and corrosives, as arsenic, turpentine, salts of mercury, mineral acids, copper, and the like, produce this condition.

What are the symptoms?

They are shown immediately after the ingestion of these substances. In the horse, colicky pains are present, the animal crouching down, pointing the nose to the region of the stomach.

The pulse is rapid and strong at first, then becomes weak, the respirations slow, the temperature high—104.5° or 106° F.

Thirst is prominent, the animal refuses food, diarrhœa is apt to be present.

If the case is fatal, signs of collapse are shown, and the animal dies from exhaustion.

How is the diagnosis made?

Depends on the history of the case, to a great extent. We might find traces in the mouth of a stomatitis.

What is the treatment?

If caused by poisons, coat the stomach with a bland mucilaginous substance, as a solution of gum arabic or flaxseed-tea.

Treat the colicky pains by solid opium—two drachms of gum opium, and don't be afraid to repeat this. Opium is a symptom medicine, and in some cases can be kept up a long time without producing poisoning.

To lessen the pain, belladonna can be given with opium. If the poison is known, give the antidote.

ACUTE GASTRITIS.

Give the synonyms.

Gastric fever; acute dyspepsia; acute indigestion; acute gastric catarrh; simple gastritis.

Define acute gastritis.

This is an inflammation of the mucous membrane of the stomach.

What is the morbid anatomy?

The mucous membrane at the pyloric end of the stomach is reddened, swollen, and thickened; the peptic glands degenerate and the membrane is covered with a thick mucus, which contains epithelial cells, granular cells, etc.

How is simple gastritis caused?

It may be caused by errors in the diet, feeding irregularly, improper food, sudden change of food, fast eating, cold drinks, or, on the other hand, a lack of the gastric juice. It is often associated with or secondary to anæmia, purpura hæmorrhagica, pneumonia, and affections of the liver.

What are the symptoms?

The first thing noticed is a change in the appetite, it becomes lessened or capricious. They yawn frequently, which is due to irritation of the pneumogastric nerve. Some European writers have stated that white hellebore when eaten by horses will produce vomiting without gastric lesions. Symptoms of nausea and even vomiting are said to be present in these cases, but they are probably rare.

The mucous membrane of the mouth being at first dry and then covered with a ropy mucus, the breath has a sour, stale smell, the tongue is coated.

Then again there may be intestinal troubles, or the flanks may be tucked up; the fæces are passed frequently and in small quantities, and the balls are often coated with mucus. Diarrhœa, accompanied by tympanites and colic, may be a symptom. Sometimes after the fæces are discharged a yellowish liquid is passed, which soils the tail and the hocks.

There is, as a rule, little or no fever, the temperature being about 101° or 102° F.

There are certain general symptoms present; the animal becomes lazy, stupid, and sweats easily; jaundice may be present from an interference with the bile-duct; the urine may be altered, it being less in quantity, there is less sediment, and the phosphates are present in noticeable quantities.

What is the prognosis?

These cases, when mild, get well, especially when under good hygienic surroundings. Sometimes in old animals it leads to death; or, again, it may go on to the chronic form.

Give the treatment.

Good hygiene is of primary importance, as is the diet; feeding with small quantities and at frequent intervals. Give water with the chill taken off in cold weather.

If the stomach is overcharged, glauber salts and tartar emetic or small doses of calomel may be given; purgatives in small and broken doses. We probably give purgatives in this manner too little; it is no doubt a nice way to administer them. Eserine and pilocarpine cause evacuations.

The sulphite of soda is good if tympanites is present. Creoline and carbolic acid are also used. Pepsine and hydrochloric acid can be given to assist digestion; also ginger, bismuth, and sodium bicarbonate are indicated, as are nux vomica and Fowler's solution. If diarrhœa and colic are present, we use dry food and astringents, as opium and tannic acid. Starch in the drinking-water is good.

CHRONIC GASTRITIS.

Name the synonym.

Chronic dyspepsia; chronic indigestion; chronic catarrh of the stomach.

Define chronic gastritis.

This is an inflammation of the stomach, chronic in its course, characterized by thickening of the mucous membrane and organic changes of the gastric glands, associated with an increased formation of mucus with an irregular appetite.

What is the morbid anatomy?

The mucous membrane is of a red, brown, or slate color, is thickened in ridges and covered with a thick whitish and sticky mucus; the gastric glands increase in size at first, but soon atrophy.

Give the ætiology.

It may be caused by errors in the diet, as fast eating, improper mastication, large draughts of water. Chronic gastritis may be associated with rachitis, anæmia, and diabetes; other causes are ulcer or dilatation of the stomach, chronic lung, heart, or liver diseases.

What are the symptoms?

The appetite is variable, at times being impaired, at other times good. The tongue is coated, the edges often red; a sour odor

comes from the mouth; the digestion is slow, which causes the food to ferment; in some cases diarrhœa may be present, while in others constipation, the fæces are hard and covered with mucous and at times shreds of mucous membrane. There is no fever, the pulse may be slow or in some cases rapid; emaciation is usually present, the skin being harsh and dry.

What is the treatment?

Regulate the diet, giving smaller quantities of food, feed regularly, and cause the animal to eat slowly.

Purges to relieve the stomach; for the pain, if any, give opium, belladonna, etc.; for fermentation, give charcoal, bismuth, sodium bicarbonate, salicylic acid, creasote; to aid digestion, pepsine, pancreatine, hydrochloric acid; to tone up the appetite, nux vomica, tincture of capsicum or ginger.

VERTIGO-ABDOMINALIS.

Give the synonym.

Stomach staggers; impaction of the stomach.

What is the definition?

This is a distention of the stomach with food, characterized by *symptoms of vertigo*, due to pressure on the abdominal vessels.

Give the ætiology.

This is not so frequently met with at present as formerly, as the principles of feeding are better understood. The stomach of the horse is small, as compared with the size of the body, and therefore should receive comparatively small quantities at a time, and more often than some animals.

The use of the nose-bag in giving the animal a mid-day meal has aided in a change for the better.

Eating greedily of cut feed, corn stalks, wheat, or too large quantities of oats. Again, during convalescence, where the animal is fed up while more or less weak.

This impaction interferes with the action of the muscular structure, and the food remains in the stomach, and as it cannot be vomited by the horse it remains there.

What are the symptoms?

They are those of gastric irritation; there is more or less uneasiness, looking around at the sides, colicky pains, pawing, lying down, rolling, sweating, possibly eructations of gas and vomiting.

Accompanying any or all of these symptoms they show signs of delirium, and hence the name *stomach staggers;* soon the delirious signs are followed by a comatose condition.

How is the diagnosis made?

It is made by the history of over-feeding, by the symptoms of colic, associated with signs of delirium and coma, together with the suddenness of the attack.

Give the prognosis.

Is grave, as a rule, as medicines are slow in action on the impacted stomach, the walls of which are incapable of acting.

What is the treatment?

Unload the stomach, which is often very difficult, as the medicines are not absorbed and do not relieve the impaction; some recommend liquids, the use of salt to increase the thirst, which is only good, as a rule, in the milder cases.

Aloes, linseed oil, and the like, aided by stimulating enemas, may be used.

Eserine and pilocarpine, given hypodermically, are indicated.

If vertigo is present, cold to the head, in the shape of an ice-bag or sponges with cold water. Bromides internally may be indicated.

RUPTURE OF THE STOMACH.

Give the definition.

By this is meant a tearing of the coats of the stomach, the contents of which ooze into the abdominal cavity.

What is the causation?

This often follows colic and ruptures from the accumulation of gas or when the stomach is full by the animal falling, and causing shock; fast or heavy work on a full stomach.

Traumatic injuries, as being run into by a shaft or pole; or the walls of the viscus may become thin from the presence of bots, etc.

What are the symptoms?

They are those of colic at the onset; soon the pain ceases, the animal seems better, but this seemingly favorable condition does not last long. They are followed by signs of collapse; a running

down, weak pulse, the temperature subnormal, the respirations rapid, cold extremities, muscular tremblings, staggering gait, absence of the intestinal murmur.

These symptoms may be present, and still there be no rupture. The position of the animal is said to be diagnostic—the lying on the sternum with the posterior parts elevated, or, on the other hand, the sitting on the haunches; but these positions are not pathognostic.

Vomiting occurs when the rupture is near the cardiac opening.

Give the diagnosis.

We cannot always diagnose during life; we merely suspect. Where vomiting exists, we are more positive.

What is the prognosis?

Rupture of the stomach is fatal, unless it be partial; that is, where there is an over-stretching of the cardiac opening. In these cases the animal may live. It is well to give a guarded prognosis.

Outline the treatment.

Keep the animal quiet by the use of anodynes, as opium or morphine hypodermically. Internal antiseptics, antacids, etc., are usually beneficial.

If pains subside, feed the animal in small quantities, and give sloppy food.

4. DISEASES OF THE INTESTINES.

SPASMODIC COLIC.

What are the synonyms?

Intestinal pain; enteralgia; belly-ache.

What is understood by the word "colic"?

The word *colic* should refer to the colon, but its use at present covers the entire intestinal tract, and even the rest of the contents of the abdominal cavity.

Colic may be defined to be abdominal pain without any anatomical changes, produced by a spasmodic contraction of the muscular structure of the intestines, characterized by uneasiness, and temporary suspension of defecation and urination.

What are the causes?

The equine race seems to be *predisposed* to colic on account of their anatomical characteristics. They cannot vomit; they eat fermentable food; then the great length of the intestines, which are apt to become twisted and the like, and the fæcal matter may become impacted.

Then, again, chillings of the skin; the direct application of cold to the mucous membrane, as a cold drink, or too large quantities of water, especially if the animal be overheated.

Overcharging the stomach may be a cause, so that we say Monday is our colic day, or after a holiday, from a lack of exercise; frozen food or poor food, or too much food. Calculi, by pressing on the terminal branches of the nerves, cause ulceration and colicky pains.

Colic is rarely due to worms; sometimes it is due to starvation, as seen in army horses on long marches; aneurisms of the mesenteric arteries are quite a common cause, especially of periodical colics.

What are the symptoms of spasmodic colic?

There are a great variety of symptoms which are shown suddenly.

If hitched before a wagon, the animal will stop, point the nose around at the sides, paw, and want to lie down; while if in a narrow stall, he will become uneasy, paw, switch the tail, look at the sides, lie down, get up, etc.

If in a box stall, he will walk around, paw, kick the abdomen with the hind foot, crouch down, or in other cases will roll on his back, and remain in this position for a time, and when the spasm comes on will get up, paw, etc.

The pain is paroxysmal at first, the intervals of ease often lasting for a considerable length of time. It may be necessary to watch these cases ten or fifteen minutes before the spasm recurs.

The pulse is about 40, increasing during the pain; the temperature is normal, or possibly elevated half a degree; the animal may sweat. Diarrhœa or constipation may be present.

Some of the unfavorable symptoms are a rapid and thready pulse, the extremities cold to the feel (especially the tips of the ears when cold and clammy), together with muscular tremblings, which can best be appreciated by applying the hand to the muscles over the shoulder. Other unfavorable symptoms are cold sweat-

ing, anxious expression, dilated pupils, the mucous membranes are dark in color or contain mahogany or saffron-colored spots.

What is the prognosis?

Always be guarded; the *prognosis* varies with the cause.

Give the indications for treatment.

First relieve the pain, and then act on the confined bowels.

To relieve the pain, anodynes, sedatives or stimulants; opium or morphine, chloral, chloroform (well diluted), ether, belladonna, cannabis indica, ginger, camphor.

To act on the confined bowels, give oils, aloes (in some cases); eserine and pilocarpine hypodermically or intravenously, or barium chloride intravenously.

Enemas of soap-suds, salt, glycerine.

TYMPANITIC COLIC.

Give the synonyms.

Tympanites; flatulent colic; wind colic; gaseous colic.

Define flatulent colic.

By this is understood colic due to the accumulation of gas in the stomach and intestines, characterized by swelling of the abdomen, more or less pain, and in some cases eructations of gas from the mouth and the passage of flatus from the anus.

Give the ætiology.

Gaseous colic is seen mostly during the hot or changeable seasons, due to the change of food, green food, etc.; the food ferments in the stomach and bowels, causing gases to form.

A lack of sufficient quantities of the digestive juices may be a cause. Wind-suckers are prone to this form of colic.

Bacterial ferments product of gases.

What are the symptoms?

The colicky pains may or may not be severe; in some cases there is a gradual accumulation of gas, the abdomen being distended to a considerable size before the animal shows signs of distress. In these cases the gas accumulates mostly in the large intestines, principally the cæcum—the swelling in these cases being most prominent on the right (off) side. In other cases, the gas is in the stomach and small intestines, causing an arching of the neck and attempts at vomiting (in some cases actual vomiting).

Other symptoms are uneasiness, pawing, rolling, passage of gas from the anus, dyspnœa.

How is the diagnosis made?

By the drum-like swelling of the abdomen, by symptoms of pain, and on auscultation borborygmi.

Give the prognosis.

Should be guarded; most cases recover. The dangers are: a rupture of the stomach, diaphragm, or intestines; also carbon dioxide poisoning, due to pressure; pulmonary œdema or apoplexy.

What is the treatment?

Get rid of the gas present, and check its formation.

Internal antiseptics are the drugs indicated in these cases to stop the formation of the gases.

Chloral hydrate is antiseptic; relieves the pain and aids in the expulsion of the gases; chloride of lime and charcoal are good; the hyposulphite of soda, sodium bicarbonate, bismuth, ginger.

Purgatives are often indicated and can be assisted by enemas of glycerine, soap-suds, or a stimulating enema containing turpentine.

Massage to the abdomen or puncturing the cæcum with a trocar and canula on the right side in the most prominent spot between the angle of the ilium and the last rib. In some cases on the left side.

The dangers of puncturing are abscesses, hemorrhage, peritonitis.

COLICS DUE TO AN ALTERED RELATION OF THE INTESTINES.

INVAGINATION, INTUSSUSCEPTION, VOLVULUS.

What is invagination?

By this is meant the condition existing where one portion of the intestines slips into another; three layers are thus present in the retained part.

Define volvulus.

This is a twisting of the gut (a rotation of the organ upon its axis) or a bending of a portion of the intestines, causing a stoppage of the canal.

What are the causes?

In many cases stricture of a portion of the intestines predisposes this condition. Spasm of the muscular tissue may be a cause.

This condition causes an interference with the circulation, producing death of the part.

How may these conditions be diagnosed?

Symptoms of colic are present, which continue, treatment giving no relief; there is pawing almost continually of one front foot; the animal will usually stand, although occasionally going down.

No fever at first; later the temperature rises a degree or so, reaching possibly 104° or 105° F. several hours before death. The pulse becomes weak, the animal sweats, which is at first warm, but later cold.

These conditions can only be suspected during life, and ought to be verified by a post-mortem.

What can be done for these cases?

Antispasmodics, as opium, belladonna, cannabis indica, chloral, chloroform, ether.

Oils, flaxseed tea, enemas, purges hypodermically or intravenously may be used.

Laparotomy is indicated, but this is very difficult in the horse.

It could be tried in the dog, as it is commonly performed with success in the human subject.

Linseed oil may be tried; eserine also.

ENTERITIS.

Give the synonyms.

Inflammation of the bowels.

What is enteritis?

This is an inflammation of the intestines, characterized by more or less fever and continual pain.

What is duodenitis?

This is an inflammation of the duodenum.

What is the term used to denote an inflammation of the ileum?

Ileitis.

What is meant by typhlitis?

By this term is meant an inflammation of the cæcum.

Define colitis.

Colitis is an inflammation of the colon.

What word signifies an inflammation of the rectum?

Proctitis.

Give the morbid anatomy of enteritis.

The mucous membrane alone may not only be involved, but it may extend to the muscular coat, thus preventing the forcing of the food along the intestines, which become paralyzed or partially so. On post mortem signs of peritonitis are most always present.

The mucous membrane is reddened in patches, as a rule, thickened, softened, and often ulcerated.

This is not a very common disease, and it takes some time for it to develop.

What is the ætiology?

It may be caused by irritants—poisons, alkalies, or acids; it may follow hernia, castration, liver trouble, embolism, aneurism, colics which are not relieved, especially if they be due to constipation, also by bacteria, toxins, cryptograms.

What are the symptoms?

This is a febrile disease, *the temperature* during the congestive stage may rise to 104° or 105° F., but as soon as the exudation is thrown out it reduces and varies from 103° to 103⅘° F., and stays about this way until death approaches, when the temperature again rises.

The pulse in enteritis is small, weak, and compressible, and very rapid.

The respirations are accelerated and thoracic.

The mucous membranes are highly injected, the mouth is clammy and hot, there is a bad odor to the breath, a frothy discharge of saliva, which has a sour smell.

There is intestinal pain and often some tympanites. The pain is constant in enteritis, the animal keeps walking around in a circle, stops at times, paws a little, and may possibly lie down once in a while; he usually makes several attempts to lie down, and when he does go down does so very carefully. They try to get on their

back and remain so for a long time, then roll over, get up, and commence to walk.

They may walk this way for a day or two; the skin will be rubbed off their eyes, hips, and shoulders from the continual rubbing against the sides of the stall.

How is the diagnosis made?

By the fever, by the continual pain, by the walking in a circle, by the pulse, which is small, rapid, and compressible, by the absence of the intestinal murmur on auscultation.

What disease is enteritis commonly confounded with?

Colic.

What is the differential diagnosis?

In colic there is an absence of fever, intermittent pain, the animals throwing themselves down violently; while *in enteritis* there is fever, continued pain, and the animals lie down carefully.

Give the prognosis.

The disease is quite fatal, although cases do recover.

What is the treatment?

Keep the animals and the bowels quiet; opium, or, better, morphine should be given till its action is obtained. Do not be afraid to give 8 or 10 grains hypodermically, repeating at intervals of three or four hours, giving belladonna in between the doses of morphine.

They used to bleed and use cathartics, but these are of no use. Do not give injections.

If diarrhœa is present, give gum opium, beginning with drachm doses and increasing according to indications.

Remember that *opium is a symptom medicine* and should be given until its action is reached. Chloral hydrate may be used in the beginning, but not after the case is well advanced.

Cannabis indica (fl. ext.) in two-drachm doses may be given in place of opium or with it.

The local treatment consists of hot blankets around the abdomen with a dry blanket over it.

The diet should consist wholly of flaxseed-tea for about forty-eight hours. After some six or eight hours, if they will not drink the flaxseed-tea, it is well to drench them with some. After, say, forty-eight hours, give oil.

DIARRHŒA.

Give the synonym.

Alvus soluta; alvine flux; purging; scouring.

What is the definition?

It is a too frequent and loose evacuation of the fæcal matter from the intestines.

Give the causes.

The kind of food; sudden change of food, soft food, frozen food, bad food.

Large draughts of water, stagnant water, purgatives; it may be associated with certain blood diseases, lung diseases, intestinal affections, or it may be produced by micro-organisms.

Horses of certain conformations seem predisposed to diarrhœa; those with a narrow body, high hips.

What is the treatment?

Diarrhœa is often an effort of nature to get rid of an irritant, and therefore we should not be too hasty in stopping a diarrhœa, as constipation, enteritis, and death may be the result.

Starch in the drinking-water (one-half pound to a pail of water); chalk is also used, one chalk ball in half a pail of water. Flaxseed-tea is good. Then again, astringents, as opium, which arrests secretions.

Tannin, mercury with chalk, catechu, sugar of lead, alum, and the like, may be used.

Rest is important; in chronic cases, give drinking-water at least an hour before driving.

CONSTIPATION.

Give the synonyms.

Alvus adstricta; intestinal torpor; costiveness.

What is constipation?

It is a functional disorder due to insufficient secretion or innervation, and characterized by the retention of the fæcal matter.

Define costiveness.

Costiveness is where there is a lack of secretion and the fæces are small, hard, and dry, while in *constipation* there is no passage at all. These terms, however, are used as synonyms.

What are the causes?

Kind of food, too much food, want of or too much exercise, old age, lack of secretions, stricture, hernia, paralysis, tumors, affections of the stomach, liver, intestines, etc.

How is constipation diagnosed?

By there not being any passage, by colicky pains, loss of appetite.

Give the prognosis.

It depends on the cause and the complications; simple cases recover.

Outline the treatment.

Attend to the diet; give laxative food occasionally to prevent constipation.

Laxatives or purges may be given; oil, calomel, aloes (in full or broken doses), eserine, pilocarpine.

Nux vomica with belladonna may be given to tone up the nerves of the intestines.

Enemas aid the purges by softening the contents of the bowels and increasing peristalsis.

If colicky pains are present, give anodynes, antispasmodics, etc., as opium, chloral, cannabis indica, hyoscyamus.

Nux vomica, belladonna, gentian, ginger, calumba, etc., may be given to assist the purge and tone up the bowels.

5. DISEASES OF THE PERITONEUM.

PERITONITIS.

What are the forms?

Peritonitis may be *primary* or *secondary, general* or *local, acute* or *chronic.*

Define peritonitis.

This is an inflammation of the peritoneum.

Give the causation.

This rarely arises as a primary disease, it being *secondary* to some other disease, or it may follow an injury or operation, as castration, or it may be associated with some disease of the organs of the abdominal cavity, as enteritis, dysentery, diseases of the liver, of the stomach, of the mesenteric glands; or it may be associated with aneurism.

Peritonitis sometimes arises in pregnant animals, or it may be seen after birth where there is metritis; this is very common in the human subject, and it may occur in our animals.

The microorganisms enter through the ruptured or inflamed parts.

What is the pathology?

The lesions may be general or local; they are local where the membrane becomes thickened, and in these cases it is very apt to spread. This is a serous membrane, and the pathology is about the same as we find elsewhere. At first the membrane becomes congested and dry; after a time exudation of fibrine and the effusion of serum takes place. The fibrine forms flakes, which form adhesions.

Describe the symptoms.

Unless peritonitis follows pregnancy, some operation, or some noticeable disease, the symptoms are more or less vague and misleading.

It is a febrile disease; the pulse is small, quick, hard, and wiry at first, becoming weaker and more feeble as the disease goes on. The temperature varies, it being 104° to 105° F. in the beginning, while later it is not so high. The respirations are difficult, short, and thoracic; the mucous membranes are reddened, the appetite is lost, the bowels are constipated, tympanites is present. The most prominent symptom is pain, which causes the animal to become uneasy, move about, lie down (carefully).

What is the prognosis?

Usually grave; ascites may be the result, the latter being rare in the horse.

Give the indications for treatment.

They are about the same as given for enteritis. Rest, anodynes, and locally heat and moisture. Cathartics and enemas are contraindicated.

Define ascites.

Hydro-peritoneum is a collection or accumulation of serous fluid in the abdominal or peritoneal cavity.

It is rare in horses, but is occasionally seen in the dog.

What are the indications for treatment?

Ascertain the cause and remove it. Act on the skin, kidneys, and bowels. Absorbents, tonics, etc., are useful.

Locally, blisters; tapping possibly. Good food and exercise are important.

6. DISEASES OF THE LIVER.

The liver is the gateway of the system, and as it has many functions to perform it is evident that functional disturbances at least, are possibly more common than is ordinarily supposed. It is one of the most important organs of the body, but on account of its deep situation, veterinarians are often unable to accurately diagnose many liver affections.

ICTERUS.

Give the synonyms.

Jaundice; the yellows.

Define icterus.

This is merely a symptom of some disease of the liver, and is characterized by a yellow condition of the visible mucous membrane due to the reabsorption of bile pigment into the blood.

How may jaundice be divided?

Icterus may be divided into two large groups: (1) *the hepatogenous* form (due to obstruction of the ducts) and (2) *the hæmatogenous* form (the non-obstructive form).

What are the causes of jaundice?

The hepatogenous form may be caused by foreign bodies within the ducts (parasites, calculi), inflammation of the duodenum or membrane of the duct, stricture of the duct, tumors causing pressure.

The hæmatogenous form may be caused by drugs, poisons, etc., producing necrosis of the liver-cells or causing a greater destruction of the red blood-cells.

What are the symptoms?

The conjunctiva or the sclerotic coat of the eye assumes a yellowish color, which varies in density; in the human subject the skin becomes yellow, which may be occasionally seen in the lower animals, especially those that are light colored. There may be certain cutaneous lesions, such as lichen, urticaria, and the like, present in some cases. The secretions are colored with bile pigment. The urine may contain pigment, which can be discovered by means of Gmelin's test and other tests for bile. In these cases very little, if any, bile passes into the intestines, and for this reason the fæces are clay colored and pasty. Constipation is present in most cases. The pulse may become slow, and in some cases there may be certain cerebral symptoms, such as delirium or coma.

The symptoms of non-obstructive jaundice are obscure.

What is the treatment?

We look for the trouble causing this symptom and treat it. Keep up the action of the kidneys by diuretics. Unload the portal system by purgatives, especially salines.

HYPERÆMIA OF THE LIVER.

Give the synonyms.

Congestion of the liver; hepatic hyperæmia.

Give the definition.

This may be defined to be an increased amount of blood in the arteries or in the veins of the liver.

Name the forms.

There are two forms, *the active* and *the passive.*

Define each.

Active hepatic hyperæmia is where there is an increased amount of blood in the arterial system of the liver.

This condition is seen temporarily as a physiological condition after each meal, caused by the rapid absorption by the portal vessels. By persistently over-feeding this congestion may be made to cause functional disturbance. The symptoms of this form are not well defined.

Passive hepatic congestion of the liver is where there is a damming back of blood in the venous system.

This is more common and is caused by an increased pressure in the efferent vessels or sub-lobular branches of the hepatic veins. It may be caused also by diseases of the valves of the heart; it may be associated with pulmonary emphysema, tumors, and the like.

What is the morbid anatomy?

The liver is enlarged, of a deep red color, and firm to the feel. The hepatic vessels are engorged, especially the central vein of each lobule. *On section,* a mottled appearance is shown, due to a congestion of the hepatic vessels and an anæmia of the portal vessels.

What are the symptoms?

There may be symptoms of gastro-intestinal catarrh, along with a yellowish condition of the mucous membrane, the fæces are clay colored and the urine contains bile pigment. Seldom do we diagnose this condition.

If diagnosed, what is the treatment?

Careful attention to the diet and the use of saline purgatives may be beneficial. If the cause is known, remove it. In chronic cases, moderate exercise.

HEPATITIS.

Name the forms.

Parenchymatous hepatitis and *interstitial hepatitis.*

ACUTE PARENCHYMATOUS HEPATITIS.

What is the synonym?

Acute hepatitis; suppurative hepatitis.

Define this form.

This is an acute inflammation of the tissue proper (hepatic cells) of the liver, often proceeding on to suppuration, which may be either circumscribed or diffused.

Although somewhat rare in the horse, it may occur in hot climates and in old horses.

What symptoms are shown?

It commences with a chill, followed by fever; pain on pressure over the region of the liver (not well marked in the horse), jaundice, constipation, and possibly colicky pains. The symptoms are not

positive. A peculiar symptom said to be shown is lameness in the off fore extremity. These cases may end in suppuration, and on post-mortem pus is found.

Outline the indications for treatment.

The treatment is *symptomatic* and *sustaining.*

The drugs to be used are quinine, salicylic acid, alcohol, aromatic spirits of ammonia, calomel, saline purgatives.

CIRRHOSIS OF THE LIVER.

Give the synonyms.

Sclerosis; interstitial hepatitis.

Give the definition.

This is a chronic inflammation of the interstitial tissue of the liver, characterized by a gradual destruction of the liver-cells due to an overgrowth of connective-tissue elements pressing on them and causing the organ to become hard and usually small.

What is the ætiology?

This is associated with chronic heart disease and diseases of the lungs, which produces a constant venous congestion of the liver, causing the central cells of the liver lobules to atrophy from an increase of the connective tissue which takes place. In rickets there is an enlargement of the liver with an increase in the connective tissue surrounding the individual lobules; in old horses it may be due to faulty feeding (over-feeding). Melanotic tumors are often found in the liver, especially in gray horses.

What is the morbid anatomy?

The liver is usually smaller, the edges are sharper, the organ is hard and difficult to tear.

The liver is roughened externally, and for this reason it has received the name of hob-nail liver in the human subject.

It is also called gin-drinkers' liver, because it is generally due to the abuse of alcohol.

What is the treatment?

Limit the diet, which should be easily digested and assimilated.

Saline purgatives to relieve the congestion.

Internally, potassium iodide, potassium nitrate, colchicum, digitalis.

AMYLOID LIVER.

Give the synonyms.

Waxy liver; lardaceous liver.

What is the morbid anatomy?

This is often seen following long standing suppuration, either of the lungs or of bones. The amyloid liver is large, and is solid, firm, resistant. *On section* it is anæmic and has a semi-translucent and infiltrated appearance. If a solution of iodine be applied, the infiltrated areas assume a rich mahogany brown color. There are no characteristic symptoms of this condition, and it is only of interest on post-mortem examination.

In these cases, where the liver is large, we should be careful not to mistake it for a case of leucocythæmia; in the latter disease examine the blood.

What is the treatment?

There are no specifics.

Calcium phosphate, iodide of iron, ammonium chloride, tonics, etc., are indicated.

FATTY LIVER.

Give the synonym.

Jecur adiposum.

What are the forms?

There are two forms of fatty liver, *fatty infiltration* and *fatty degeneration.*

Define each.

Fatty infiltration occurs in normal livers, since the cells always contain minute globules of oil. In this condition there is an overabundance of fat in the cells.

In fatty degeneration, which is less common, the substance of the liver-cells is destroyed, and fat takes its place.

What are the causes?

Fatty liver may occur in an animal that is fat, in which case the liver seems to act as a storehouse of the excessive amount of fat. It may occur where the oxidation processes are interfered with, as in anæmia. Certain poisons, as phosphorus, produce fatty degeneration with a destruction of the liver-cells.

The fatty liver is uniformly increased in size, is smooth, bloodless, and looks pale or yellowish; *on section*, it is dry and the surface of the knife is greasy. The organ may weigh more, but its specific gravity is less, and it may float in water.

Give the symptoms.

These are not definite. Jaundice may be present in some cases. The stools may be light colored. Horses subject to colic or those that show colicky pains at varying intervals often have fatty livers.

Outline the treatment.

Moderate exercise, limited diet, with occasional saline purgatives, diuretics, or diaphoretics.

7. DISEASES OF THE SPLEEN.

It is rare to find diseases of this organ in our animals. Its functions are somewhat obscure, and it being situated out of our reach we are unable to tell its condition. Most all of its affections are, however, usually secondary.

The organ may, however, become congested, inflamed; it may contain new growths, or, again, it may rupture.

Emboli are here found.

SPLENITIS.

Define splenitis.

This is an inflammation of the spleen, and is rare in the horse, being more frequent in the bovine race.

The spleen may become enlarged, which is often interesting on post mortem; as in glanders, leucocythæmia, tuberculosis.

It may become enlarged during certain fevers, also in conjunction with certain diseases of the liver; in the human subject, in malarial fever.

Amyloid degeneration may take place.

What is the treatment?

Ascertain the cause and treatment of affection with which it is associated.

8. DISEASES OF THE PANCREAS.

This organ is commonly called sweet-bread, or the abdominal salivary gland.

PANCREATITIS.

What is pancreatitis?

This is an inflammation of the pancreas, and may be acute or chronic, or may be parenchymatous or interstitial.

The principal symptoms recorded are more or less fever, general emaciation, and the expulsion of fatty excrementitious substances.

There is nothing positive upon which to make a diagnosis of affections of this organ.

What is the treatment?

It is *symptomatic.*

SECTION VI.

DISEASES OF THE URINARY SYSTEM.

DISEASES OF THE KIDNEYS.

CIRCULATORY DISTURBANCES.

RENAL HYPERÆMIA.

What is the synonym?

Congestion of the kidneys.

Define the condition.

This is a condition where there is an increased amount of blood in the vessels of the kidney.

Name the forms.

There are two forms—*active* or *arterial congestion,* and *passive, venous, mechanical,* or *chronic congestion.*

Give the causes.

ACTIVE HYPERÆMIA is caused by traumatism, by exposure to wet or changeable weather, certain drugs, as cantharides, turpentine, potassium nitrate, carbolic acid, etc.; then, again, irritating urine, paralysis of the vasomotor nerves of the kidneys, certain bacteria and poisons which cause infectious diseases.

PASSIVE CONGESTION is the result of, or dependent on, diseases of the heart, such as diseases of the valves, diseases of the lungs interfering with the circulation; pressure on renal veins by tumors, or in pregnancy or from the presence of thrombi.

What symptoms are most prominent?

In the active form, the animal may be dull, but there is little or no fever, frequent urination, the urine being high colored and containing traces of blood, a large amount of albumin and having a high specific gravity.

In passive congestion, the symptoms are about the same as above, except being more chronic and associated with cardiac disease. The quantity of urine is not much diminished, the specific gravity very slightly altered, traces of albumin, and on microscopical examination hyaline casts may be seen.

Give the treatment.

Stimulate the skin and kidneys; use hot fomentations over that region.

A drastic purgative should be given, produce sweating, and allow plenty of drinking-water, with the addition of flaxseed or mucilage.

Camphor, digitalis, nitroglycerine, morphine, and potassium iodide are among the drugs indicated.

To reduce the quantity of blood in the organs increase the heart's action or cause a dilatation of the capillaries.

NEPHRITIS.

What are the forms?

Parenchymatous nephritis and *interstitial nephritis*, each of which may run an *acute* or *chronic* course. These cases are rare in the horse, or else they are overlooked.

ACUTE NEPHRITIS.

Give the synonyms.

Acute parenchymatous nephritis; acute tubular nephritis; acute Bright's disease; acute diffuse nephritis.

Give the definition.

Acute diffuse nephritis is an inflammation of the epithelial, vascular, and intertubular (stroma) tissues.

What is the ætiology?

It occurs both as a primary and secondary disease, and may be caused by exposure to cold, wet weather, or by certain drugs, as turpentine, chlorate of potash, carbolic acid, arsenic, phosphorus.

Pregnancy from pressure may be a cause; also poisons of specific fevers.

Again, it may be associated with such diseases as peritonitis, dysentery, septicæmia, meningitis, pneumonia, etc.

What is the morbid anatomy?

The cortical portion of the kidney is swollen and congested, pressing on the tubules and pyramids, which become reddened and congested, and in some cases producing capillary hemorrhage into the pelvis.

Under the microscope, the Malpighian bodies are prominent, being swollen and congested. Epithelial casts may be seen from the tubules.

Give the symptoms of acute nephritis.

If due to exposure, the symptoms are sudden. Chills with slight fever may be present. The principal symptoms are referable to the urine, which may be diminished in the beginning, high-colored, containing blood, albumin, and casts of the tubes.

On standing, a heavy deposit is noticed; the microscope shows blood corpuscles, epithelium from the tubes and urinary passages, together with casts, which are hyaline.

Anæmia is an important symptom; dropsy is present, which may be slight or extensive; the pulse is hard, the skin dry; there is a rigidity of the back and a stiffness of gait, pain on pressure over the lumbar region, whether that pressure be exerted externally or per rectum.

How is the diagnosis made?

These cases are rare, but when present the symptoms should be sufficient to enable a diagnosis to be made.

What is the prognosis?

This varies with the symptoms presented and whether it be primary or secondary. Death may occur in a few days or weeks, or recovery take place within a month or two.

Outline the treatment in acute nephritis.

Perfect rest is essential. Blankets and bandages to aid in producing sweating, which is of the utmost importance.

Plenty of water should be given the animal to drink to wash out the kidneys.

Purges and diaphoretics are to be used to give as much rest to the kidneys as possible.

Treat the other symptoms as they arise, and if the disease be secondary look after the disease with which this affection is associated. The diuretics to be used are principally digitalis and stro-

phanthus. Potassium iodide may also be of service, especially if dropsy be present.

If anæmia is present give iron, tonics, etc., to build up the system.

If the animal be uneasy, bromides, chloral hydrate, or opium may be of service.

CHRONIC NEPHRITIS.

What are the forms?

There are two forms—*chronic parenchymatous nephritis* and *chronic interstitial nephritis.* The former is not very common and not so important as the latter.

CHRONIC INTERSTITIAL NEPHRITIS.

What are the synonyms?

Contracted kidney; cirrhosis of the kidney; granular kidney.

Define the same.

This is a chronic inflammation of the connective tissue of the kidney, causing pressure on the secreting structures of that organ with an impairment of function.

Give the causes.

It is rare in the horse. It may be caused by continued exposures, overwork, or abuse; a highly nervous temperament is predisposing. Continued elimination of microbes and toxines by the kidneys.

What is the morbid anatomy?

The kidneys are small, the capsule thickened and adherent, and in stripping it off, portions of the substance of the kidney are removed.

On section, the organ is tough, the cortical substance very thin, the Malphigian bodies and the tubal structures atrophy from the overproduction of connective tissue which presses on these structures.

What symptoms may be shown?

The symptoms are vague in the horse. The urine is increased in amount, is a clear yellow, does not contain sediment, and the solid constituents of the urine are diminished.

The pulse is usually hard, its tension is increased, this being caused by the obstruction in the kidneys requiring the heart to exert more force to overcome the obstruction.

Thirst is prominent, irregular appetite and digestion, skin hot and dry, unless dropsy is a complication.

What can be done in these cases?

If a diagnosis can be made, treat symptomatically, as the disease itself is incurable.

Watch the bowels and skin, keeping them in the best possible condition.

Potassium iodide, iodide of iron, small doses of mercury bichloride (the latter being supposed to prevent the formation of new connective tissue) are among the drugs indicated.

PYELITIS.

What is pyelitis?

This is an inflammation of the mucous membrane of the pelvis and calices of the kidney. *Pyonephrosis* is pus in the pelvis of the kidney.

What are the causes?

It is rarely a primary disease; it is usually *secondary* to mechanical irritation from calculi or the result of an extension of inflammation from some of the neighboring parts. Some cases of microorganisms produce this condition.

How is the diagnosis made?

It may be made mostly by a microscopical examination of the urine, by the presence of epithelium from the pelvis of the kidney, together with blood-cells and mucus, and in the more advanced stages possibly pus.

What can be done for these cases?

Rest for the animal, free access to drink, and a restricted diet.

The drugs to be used are potassium nitrate, quinine, together with internal antiseptics.

Hot fomentations or blisters over the region of the kidneys may be useful.

Define perinephritis.

This is an inflammation of the capsule and cellular tissue surrounding the kidneys.

What is hydronephrosis?

This condition is also called *hydrops renum*, and is an accumulation of non-purulent fluids, the result of obstruction, causing a dilatation of the pelvis and calices of the kidney, with atrophy of its substance.

What may cause dropsy of the kidney?

It may be caused by pressure from tumors, calculi, blood-clots, parasites, etc., blocking up the ureters and producing the accumulation of fluid in the pelves of the kidneys. This condition is difficult to diagnose.

Define nephroptosis.

This is called *floating-kidney*, and is a condition due to the kidney breaking loose from its position, being normally held by its capsule, by the peritoneum, and by blood-vessels. It is rare and only interesting to us on post mortem.

What is meant by nephrolithiasis?

By this is understood a *formation* in the kidney or its pelvis by the deposition of certain of the solid constituents of the urine.

THE URINE.

What are the physical properties of the urine?

It is more or less transparent, of a yellowish color, is alkaline, neutral, or acid in reaction, has a strong and peculiar odor, and a specific gravity varying from 1020 to 1060.

Describe and give some of the normal constituents of the urine.

Normal constituents are the result of tissue changes taking place in the body.

The *inorganic* constituents are principally sodium, potassium, calcium, and magnesium (carbonates, chlorides, sulphates, etc.).

The *organic* constituents are chiefly urea, uric acid, hippuric acid, etc., coloring matters and extractives.

What changes may take place in disease?

Abnormally, there may be an increase in the normal constituents or they may be present abnormal substances. These changes cause alterations in the quantity, color, odor, reaction, specific gravity, etc.

How may the quantity of urine be altered?

The quantity may be increased (polyuria); diminished (fevers). When the animal perspires freely the amount of urine is less, and more when the skin is chilled.

What variations in the color and odor may be noticed?

The *color* may be changed, being dark brown or black in azoturia, smoky red or brown when it contains blood, milky when it contains pus, greenish or reddish brown from the presence of bile. In other cases, when the coloring matter is lessened, the urine is lighter in color.

The *odor* may be very strong, have the odor of ammonia or be otherwise peculiar.

What is the reaction of the urine of the horse?

The *reaction* of the urine of the horse varies with the kind of food. It is usually *alkaline*, except in the suckling foal and an animal starving, when it becomes acid.

In disease, a change is apt to occur, the reaction varying with the individual case.

How may the reaction be determined?

To determine the reaction it must be done soon after the urine is voided, as changes are apt to take place.

If the reaction be *alkaline*, it is necessary to ascertain whether it is "fixed" or "volatile." Hang a piece of red litmus paper, that has been partly moistened with the urine, in the air to dry; if, when dry, the blue color remains, then it is due to a *fixed alkali* (phosphates or carbonates); while if the red color returns, then a *volatile alkali* (ammonia).

Add hydrochloric acid in excess to the urine in a test-tube and warm; if effervescence, the *carbonates* cause the alkalinity; if not, the *phosphates*.

What changes may occur in the specific gravity?

The *specific gravity* may be altered, being *high* when the quantity passed is diminished: in fevers, diabetes mellitus, when bile is present, or when the solids are increased.

It is *low* when the quantity is increased, as after large draughts of water, in polyuria, when albumin is present, or when there is deficiency in solids.

Name some important substances found in disease.

Some of the normal constituents may be abnormally increased, as urea, etc., phosphates, chlorides, etc.; in other cases, albumin, bile, blood, sugar, pus, epithelial casts may be present.

How are you to proceed to examine the urine?

If possible collect all the urine passed during the twenty-four hours and take a sample of the mixture.

Note carefully all the physical properties, and then test for special substances.

Give a test for the phosphates.

The earthy or alkaline *phosphates* are discovered by heating a quantity of urine in a test-tube, when a cloudy appearance is presented; this milky appearance disappears on the addition of acetic or nitric acid.

How may albumin be discovered in the urine?

Heat to boiling some urine in a test-tube; a milky appearance shows the presence of *albumin*, provided it does not disappear on the addition of nitric acid.

What is the test for bile?

Heat till yellow some nitric acid containing small pieces of wood, and then cool; now float some urine on the cold acid. If bile pigments are present, a green band forms at the junction which shades into blue, red, violet, yellow (Gmelin's test).

Give the test for urea.

If the urine contains *urea* in excess, the rhombic-shaped crystals of the nitrate of urea separate, when nitric acid is added to a cold concentrated solution of urine. This is best appreciated by using a thin layer on a plate or watch-glass.

How may blood be discovered?

If the urine is red, smoky, or dark in color, suspect the presence of *blood.*

1. Heat, about to boiling, alkaline urine to which potassium hydrate has been previously added, and a red precipitate is produced.

2. Mix oil of turpentine and tincture of guaiac; now add as much urine as the mixture, shake carefully, and after a time a *bluish* or *greenish color* on top shows the presence of blood.

The presence of sugar is how ascertained?

The urine is generally pale in color, the specific gravity high, and is more or less permanently frothy when shaken.

Before testing the urine for sugar the albumin should be first separated by rendering the urine very slightly acid with acetic acid, heating, and filtering.

Give test for sugar.

1. Take equal volumes of urine and liquor potassæ and heat; if sugar be present, a *yellow* to a *brown color* is presented, varying according to the amount of sugar.

The *odor of molasses* is observed on the addition of nitric acid (Moore's test). This should not be relied on altogether, so that other tests should be made.

2. Heat to boiling a drachm or two of Fehling's solution in a test-tube; no change should take place. Now add the urine to be tested, drop by drop, and if sugar be present a *green color* is presented, together with a yellow or red precipitate of cuprous oxide (Fehling's test).

Other tests may be resorted to, as Trommer's test, Boettger's test, the fermentation test, etc.

Give a test for the presence of the chlorides in the urine.

Silver nitrate gives a white precipitate, which becomes dark if exposed to the light. The precipitate is soluble in ammonium hydrate, but insoluble in nitric acid.

How may pus be detected?

If *pus* be present it can best be detected by the use of the microscope. By the addition of acetic acid the numerous nuclei of the pus-cells are made distinct, so that mistakes ought not to be made.

In all cases when pus is present in the urine albumin is also present.

What kind of casts may be found in the urine?

Epithelial casts, hyaline casts, granular casts, blood casts, fatty casts.

HÆMATURIA.

What is understood by hæmaturia?

This is a condition or symptom of some disease, characterized by the presence of blood in the urine.

Give the causes of hæmaturia.

This may be associated with purpura hæmorrhagica, hemophilia, leucocythæmia, the specific fevers, etc., or it may be caused by parasites, stone in the kidney, certain drugs, traumatic injuries.

How is hæmaturia diagnosed?

It can be easily diagnosed by the smoky or bright red color of the urine, by finding red blood-cells by the use of the microscope, by the testing of the urine for blood, or by the use of the spectroscope.

If the blood comes from kidneys, it is well mixed with the urine, or may be in clots; from the bladder, it is found at the end of the act of urination; from the urethra, the blood comes just before the urine.

Give the prognosis.

This depends on the cause, extent, and location of the seat of hemorrhage, whether from the kidneys, bladder, urethra.

What are the indications for treatment?

Look for the cause and the seat of hemorrhage and treat accordingly.

Hæmastatics are indicated, together with cold to the region of the kidneys.

Stimulants, tonics, good food, etc., are usually required to overcome the weakness caused by the loss of blood.

PYURIA.

Define pyuria.

By pyuria is understood a condition with the presence of *pus* in the urine.

Give the causes.

It may be associated with pyelitis, pyelonephritis, cystitis, urethritis, leucorrhœa, or abscesses rupturing into the urinary passages.

What is the treatment?

Look for the cause and location and treat the case as is required.

ANURIA.

Give the definition.

By this is meant a total *suppression* of urine from any cause.

What may cause this condition?

In renal congestion where the urine is not formed; calculi blocking the ureters; various poisons; collapse after injuries or operations; nervous irritation.

What symptoms may arise?

This condition is somewhat rare, although the laity call our attention to it quite frequently in cases of colic or enteritis.

It is seen in spinal meningitis and azoturia, and also temporarily in colics due to spasm.

What can be done for these cases?

Purges, diuretics, diaphoretics, antispasmodics, according to the indications.

Locally, hot applications, blisters, or liniments to the loins.

Catheterization should be resorted to, and, if necessary, continued once or twice a day.

INCONTINENCE OF URINE.

What is understood by this condition?

This is the opposite of the foregoing and characterized by more or less constant *dribbling* of the urine.

Give the ætiology.

It may be caused by injury to the spinal cord or some irritation to that part or other nervous mechanism connected with these structures, which causes the urine to dribble away as fast as it is secreted.

Outline the treatment.

The drugs indicated are principally belladonna or strychnine, the former being given until its physiological limit is reached.

Moderate exercise may be of benefit in some cases.

CYSTITIS.

Give the definition.

This is an inflammation of the mucous membrane of the bladder.

What may cause the same?

Mechanical injuries, certain drugs or chemicals; it may be of specific origin or it may be an extension from some adjacent inflammation.

What symptoms are presented?

The urine is opaque, may contain shreds of mucous membrane, pus-cells, and sometimes blood.

By a rectal examination it may be possible in some cases to find the walls of the bladder thickened.

What treatment can be employed?

Wash out the bladder with antiseptic solutions, as boric acid, quinine, bichloride of mercury.

The animal requires rest, flaxseed-tea or other mucilaginous drinks.

The drugs indicated are belladonna, hyoscyamus, morphine by the mouth or in suppositories.

SECTION VII.

DISEASES OF THE CIRCULATORY SYSTEM.

Diseases of this system no doubt occur much more frequently than veterinarians suppose; they are probably overlooked in many cases, owing to the deep situation of the heart, the thickness of the skin, the presence of large muscles, and the difficulty of obtaining results from the physical signs, and to otherwise examine the heart.

The average number of pulsations per minute are (as stated elsewhere) 36 to 40.

The number of beats normally varies with the temperament, age, work, etc. In the country, where quiet prevails, the number of beats per minute is less and the arteries are more full, whereas in cities the animals are called upon to do more rapid work, which causes the number of heart-beats to be increased.

PERICARDITIS.

What are the forms?

Pericarditis may be *acute* or *chronic.*

ACUTE PERICARDITIS.

Define acute pericarditis.

It is an acute fibrinous inflammation of the pericardium and is characterized by fever and a very rapid pulse.

Give the ætiology.

It may exist as an independent disease, but it is usually secondary to such diseases as pneumonia, pleurisy, purpura hæmorrhagica, and certain of the infectious diseases.

What is the pathology?

The pathology is about the same as serous membranes in other situations; for study, three stages are recognized:

First stage, or *stage of hyperæmia, congestion,* or *engorgement; second stage,* or the *stage of exudation* and *effusion; third stage,* or the *stage of absorption.*

There is a dryness of the membrane, which is congested; soon an exudation of lymph scattered in patches takes place, which gives the dry, shaggy appearance, and is called *dry pericarditis.*

Then an effusion of a sero-fibrinous fluid is presented, with flocculi floating in it and at times mixed with blood; the serous effusion accumulates at the base of the heart, where the folds of the membrane are loose, and as it increases in amount it runs down and pulls the pericardium.

What becomes of these products?

The watery parts may be absorbed, the fibrine undergo fatty degeneration, or become organized and form false membranes and bind the heart to the pericardial sac.

What are the symptoms?

It is generally preceded by a chill, followed by symptoms of fever; the skin becomes hot, there is dryness and redness of the visible mucous membranes, and a very high temperature.

The principal symptoms are connected with the circulation of the blood; the *pulse* is hard and very quick, it often being 100 per minute, and it is very rare in the beginning of any other affection to get so rapid a pulse.

Give the physical signs.

On percussion, in the early stages, no change, while during the stage of effusion, cardiac dulness is enlarged.

Auscultation should give some valuable results; early, when the membrane is dry and reddened, a friction sound may be heard and at the same time as the beat of the heart or the pulse, and not influenced by breathing.

It is often hard to tell whether the sound is intra- or extra-pericardial. It may be a pleuritic sound, which is more commonly heard.

During the stage of effusion, *auscultation* shows the friction sound being lost (as the effusion accumulates) on account of the layers becoming separated; the heart sounds less distinct or absent, and during the third stage the heart sounds are more distinct and the friction sound returns.

How is the diagnosis made?

This affection, as well as many others of the heart, requires a good deal of study and attention in the equine to make a diagnosis.

It may be diagnosed by an *increased dulness* of area on percussion, the *friction sound* heard at the same time as the pulse beats, by the *rapidity of the heart's action* being greater than in any other disease, and by the area of dulness being less than that of pleurisy.

What disease might especially be taken for pericarditis?

Pleurisy.

How can you make a differential diagnosis?

In pericarditis the area of dulness is limited, whereas *in pleurisy* it is greater.

On auscultation, the friction sound *in pericarditis* is limited to the area of the heart, and is heard at the same time as the pulse-beats, whereas *in pleurisy* it is usually over a larger area and has no connection with the pulse. Pericarditis often follows pleurisy.

Give the prognosis.

If the disease is very intense, the animal generally dies in a few days from shock; other cases get well, the exudation becoming absorbed, but the heart may remain weak for some time; still other cases linger along and die from œdema of the lungs, while still others die from cardiac paralysis.

Give the treatment.

Perfect rest is essential. The early use of sedatives, as aconite or veratrum, to reduce the heart's action and relieve the symptoms. Opium is one of the best to keep the heart quiet and free from pain; if this does not act well it may be assisted by small doses of chloral.

Mustard and other irritants are contra-indicated in the early stages; warm applications are the best, as blankets rung out of fairly hot water placed over the parts, with a dry blanket over that; in some cases cold over the heart region is recommended. In the human subject, hot poultices are used, or an oil-silk jacket, which is excellent in horses.

Quinine is indicated in most all cases; after the acute symptoms have subsided, and to obviate heart failure, digitalis may be indicated, which also has a diuretic effect. Alkalies, as ammonium carbonate, potassium nitrate, often are used along with digitalis.

In the human subject the liquor ammonia acetatis and potassium carbonate are used with good results.

After the fever is gone, and an effusion is suspected, use iodide of potassium; also blisters externally at this time. In man they often tap, but it cannot accomplish any good in the horse.

ENDOCARDITIS.

What are the forms?

Acute and chronic endocarditis.

Define each.

Acute endocarditis is an acute inflammation of the lining membrane of the heart and that forming the valves, and characterized by a loss of continuity or substance in the tissue of the valves and by the presence of vegetations.

Chronic endocarditis is a chronic inflammation of the lining membrane, characterized by a hardening, thickening, puckering, and deformity of the lining membrane and valve substance.

Give the ætiology.

Endocarditis is seldom diagnosed in the horse during life.

It is rarely a primary disease, it being secondary to rheumatism (which is rare in the horse), to pericarditis, to pleurisy, to erysipelas, to laminitis, to chorea; it may be caused by infection, cold, and traumatisms.

What are the symptoms?

It is secondary as a rule, and the symptoms are obscure in the horse.

In man this condition is diagnosed by the physical signs and the history of the case, and even then is difficult in many cases.

What is the pathological anatomy?

The membrane becomes reddened, followed by an opaque condition, and often the epithelial layer is raised and lost, and the membrane becomes rough, and in these places the fibrine coagulates in patches or layers, which patches or layers are often washed off into the circulation and form emboli, which go to the liver and the spleen (rarely to the lungs), and there form abscesses.

The tendency is to the formation of vegetations; these warts or vegetations found on the valves are hardened connective tissue

at the base and at the apex are cellular growths. This produces a thickening and a contraction of the valve, and when the heart contracts the blood is forced back.

What is the treatment if the disease is diagnosed?

There is not much to be done; perfect rest is important.

The following drugs can be given, according to the indications: digitalis, aconite, salicylates, potassium iodide, and stimulants in some cases.

MYOCARDITIS.

Define myocarditis.

It is an inflammation of the muscular structure of the heart.

This condition cannot be appreciated in the horse, but it frequently occurs in the ox tribe from traumatisms, and can be diagnosed in these animals.

CARDIAC HYPERTROPHY.

What is the synonym?

Hypertrophy of the heart.

Define this condition.

This is an enlargement or increase of the muscular tissue forming the walls of the heart, with or without alterations in the size of the cavities.

Name the forms.

There are three forms of cardiac hypertrophy: (1) SIMPLE CARDIAC HYPERTROPHY, where the walls are increased in thickness, there being no change in the size of the cavities; (2) ECCENTRIC CARDIAC HYPERTROPHY (hypertrophy with dilatation), where the walls are thickened and the cavities enlarged; (3) CONCENTRIC CARDIAC HYPERTROPHY, where the walls are increased and the cavities are smaller; this form is now considered to be a post-mortem condition.

What is the pathology?

The normal *capacity* of the heart is about one to one and a quarter pints, its average weight being six and three-quarter pounds.

For convenience, we may say that its long diameter is ten and

one-half inches, the antero-posterior diameter seven and one-half inches, and its lateral diameter five and one-half inches.

Before examining the heart as regards dimensions, soak it in water so as to relax it.

In hypertrophy, the muscular substance looks darker and is more resisting, it being harder and more like fibrous tissue.

There may be fatty degeneration, in which case the muscle is lighter in color and easily torn.

The heart often weighs twice as much as normal; it has been found to weigh fourteen pounds (in Eclipse), or more.

The apex is broader in these cases.

How is this caused?

It may be due to diseases of the valves, altered innervation, adhesions of the pericardium, any interference with the pulmonary circulation, narrowing of the openings, prolonged muscular exertion, contractions or diseases of the arteries or capillaries.

Give the symptoms of cardiac hypertrophy.

Dyspnœa is often present as the first symptom.

There are often symptoms of a passive congestion of the lungs, which are apt to take place in these cases and cause the dyspnœa.

There is an increased impulse to the heart, it usually being more bounding and full.

What are the physical signs?

On palpation, the impulse is more forcible, the pulse is full and slow; *on percussion,* the area of dulness is found to be increased in size; *on auscultation,* the sounds may present no special change, except the first sound, which may be dull and prolonged.

Give the indications for treatment.

Rest, with any of the following drugs, according to indications: digitalis, aconite, veratrum viride, iodide of potassium, camphor, ether, caffeine.

CARDIAC DILATATION.

Give the definition.

Dilatation of the heart is an increase in the size of one or more of the cavities of the heart, with or without thickening of the walls.

What are the forms?

There are two forms recognized, one being *dilatation with thickening*, and the other *dilatation with thinning*.

Give the ætiology.

Weakening in the walls of the cavities, together with increased pressure, are the main factors in producing dilatation.

Changes in the heart muscle, adhesions of the pericardial sac, increased amount of blood in the heart, excessive work, valvular disease, and lung diseases are among the causes of dilatation.

What is the morbid anatomy?

Dilatation is more frequently present in the right side of the heart and is usually associated with hypertrophy of one or more of the cavities. Great distention causes an incompetency of the valves, thus allowing regurgitation.

The endocardium may be opaque, especially in the auricles, and marked alterations are shown by the use of the microscope.

Give the symptoms and physical signs.

A dropsical condition may be the result in some cases, the pulse becomes weak and rapid, the breathing difficult, and signs of obstructed venous circulation are present.

On percussion, the area of dulness is increased, a condition very difficult to determine in the horse.

On auscultation, the first sound is shorter and sharper, somewhat resembling the second sound.

Give the indications for treatment.

In some cases stimulants, as ammonia or alcohol; digitalis is especially indicated in dilatation; strophanthus may be used as a substitute for digitalis. Other drugs indicated are iron, arsenic, strychnine, morphine. Purges in some cases. Avoid over-exertion and give concentrated food.

CARDIAC PALPITATION.

Give the synonyms.

Palpitation of the heart; irritable heart.

Define this condition.

This may be defined to be a functional cardiac disorder, characterized by an *increased frequency* of the heart's action and an irregularity of its rhythm, which at times becomes intermittent.

What is arrhythmia?

This may be defined to be a condition where one or more of the beats of the heart are dropped (*an intermittent heart*).

Define tachycardia.

Tachycardia, or rapid heart, is where there is a rapidity of the heart's action, which may, in some cases, be perfectly normal.

What is brachycardia?

By this is meant to be a *slowness of the heart's action*, and may be divided into physiological and pathological conditions, the latter being seen in convalescence from fevers, digestive disorders, diseases of the blood and circulation, of the nervous system, or may be due to toxic agents.

What is the ætiology of palpitation of the heart?

Overwork, fear, excitement, kicks, blows, etc., continued digestive disorders, irritation of the cardiac ganglia, chronic liver troubles and the like are among the principal causes.

What are the symptoms?

They vary with the intensity of the affection; it may be slight, there being only a fluttering of the heart, or in other cases the pulsations are increased, the beats are more forcible (they may or may not be irregular), the arteries throb, the respirations become difficult, and signs of great distress are present.

The physical signs are usually negative; the sounds are clear and metallic on auscultation, and the shock can be obtained by palpation. The symptoms may last a few minutes, or, in other cases, an hour or so.

How is the affection diagnosed?

By the absence of the physical signs of organic disease; by the rapidity of the action of the heart; by its irregularity of rhythm, and it possibly being intermittent.

What is the prognosis?

Usually good, although the real cause may be difficult to overcome.

Outline the treatment.

The drugs that may be given include the bromides, veratrum viride, valerium, camphor, chloral, asafœtida, and in some cases digitalis with nux vomica. Iron is useful in these cases.

Moderate exercise and careful attention to the diet are important.

SECTION VIII.

DISEASES OF THE DIAPHRAGM.

SPASM OF THE DIAPHRAGM.

What is the synonym?

Thumps; hiccoughs in man.

Give the definition.

This is a symptom of some affection, and consists of an intermittent and sudden contraction of the diaphragm, characterized by convulsive movements of the whole body, associated with *a thumping sound*, which may be heard at some distance from the animal, or whose shock can be felt by applying the hand to that region.

What are the causes?

It may be the result of direct irritation to the diaphragm, cold drinks, colics, overloading of the stomach, inflammations, especially those affecting the abdomen and contents; it may be caused by certain constitutional diseases; it may be of neurotic origin, or it may be produced by fast driving.

What is the treatment?

The treatment seems to be very unsatisfactory, but the symptom, in most cases, soon disappears.

Among the drugs indicated are chloral hydrate, morphine, potassium bromide, camphor, valerium, and, in some cases, stimulants.

RUPTURE OF THE DIAPHRAGM.

What may cause this condition?

It is occasionally a complication of flatulent colic, the gas causing pressure on the diaphragm, and from the animal throwing

itself down violently, or other violent movements, causes a rupture in this partition.

Punctured wounds penetrating the diaphragm, or, in other cases, some change or weakness in the substance of the organ.

Give the most important and constant symptoms.

These are often indefinite and may be vague in some cases. Difficult breathing, intense pain at first, sitting on the haunches, lying on the sternum.

Soon *signs of collapse* appear; a feeble and rapid pulse, extremities which were warm become cold and are bathed in a cold sweat; the respirations are increased and labored, the eyes are staring, there is an anxious look, more or less uneasiness, and death in a few hours.

Is there any treatment?

Try to relieve the pain by the use of opium, etc.

SECTION IX.

DISEASES OF THE NERVOUS SYSTEM.

What is delirium?

The term *delirium* is difficult to define, on account of its being so variously applied; in veterinary practice it is usually considered to be incoherent acts of an animal.

Define hyperæsthesia.

This is a condition characterized by an exalted excitability in the various parts of the sensory apparatus, that is, *increased sensation.*

What is hyperalgesia?

It is a condition characterized by that form of pain of a part designated as *tenderness.*

What is meant by paræsthesiæ?

By this is meant those sensations which arise centrally in the nerve-fibres or centres, and are sent outward toward the surface or periphery and recognized by consciousness; examples are pain, coldness, heat, constriction, distention, malposition, etc.

Define anæsthesia.

This is an interruption in the conducting power of sensory nerves characterized by a partial or complete loss of sensibility in areas of the skin.

COMA.

Define coma.

Coma is a functional condition characterized by a state of unconsciousness from which the patient cannot be aroused, or is aroused with some difficulty.

What is meant by carus?

Carus signifies that state from which the patient cannot be aroused, and is called profound coma.

What is understood by sopor?

Sopor is a moderate coma, or a semi-comatose condition.

How does coma differ from sleep?

Sleep is a physiological condition, necessary to the body as a whole, while *coma* is a pathological condition not benefiting the system, and therefore not a substitute for sleep.

Give the causes of coma.

It is a symptom of certain brain diseases, and in many cases is due to a want of the oxygen supply to the brain substance.

It may be seen in certain of the so-called neuroses, as epilepsy, etc.; also in certain diseases outside of the nervous system proper, as diseases of the kidneys, the liver, as well as some of the general diseases and certain febrile affections.

This condition may be produced by the use of certain drugs, as chloroform, alcohol, opium, etc.; also probably by toxins.

What should be done in these cases?

Look for the affection producing this symptom and treat it.

When the real cause cannot be ascertained, a stimulating treatment is usually required, followed by nerve tonics.

PAROXYSMAL VERTIGO.

What are the synonyms?

Staggers; blind staggers; dizziness; vertigo; nerve storms.

Give the definition.

Vertigo literally means a turning around, and may be defined to be a functional affection characterized by a sense of defective equilibrium with or without change of position.

What are the causes?

Among horses this condition often occurs periodically, the animal in these cases being termed "fitty"; in other cases the animal may have an attack, and never have another.

These attacks may be caused by some affection of the brain and spinal cord or of the eyes; then, again, climatic influences, as prolonged heat, dark, damp, and hot stables.

It is seen in plethoric horses, especially when not exercised sufficiently, or horses used in brick-yards, where they travel in a circle; being aboard boats or cars.

It may follow bleeding or the rapid delivery of a fœtus, or the evacuation of a large quantity of exudate, as from the pleural cavity, or diseases of or pressure on the blood-vessels.

Ill-fitting harness, as a tight collar or throat-latch, producing pressure on the jugular vein, may be a cause; then there is an hereditary tendency in some cases, horses that are high headed (*star-gazers*), long, narrow necks seem predisposed.

Parasites in the blood-vessels may be a cause.

What are the symptoms?

It usually occurs while the animal is hitched up; the horse stops suddenly, shakes the head as though there was a fly in the ear, trembles, and may fall down, or the attack passes off in a few minutes. In some cases there is a tendency to run (termed running staggers); this is when they are liable to do damage to themselves and to property.

A second or third paroxysm may come on if driven immediately after the first attack.

How is the diagnosis made?

By the symptoms coming on suddenly, by the condition of the harness, etc.

What is the prognosis?

It is good if no malformation or organic trouble exists. They are all liable to re-attacks.

What is the treatment for vertigo?

During the paroxysm, keep the animal as quiet as possible to prevent injury to body and to property. Cold applications to the head are useful; bromide of sodium or potassium may be given.

Adjust the harness. These paroxysms tend to pass away and the animal recovers without any treatment. The common practice of scarifying the roof of the mouth is not to be resorted to, as it does no good and may produce a serious complication of hemorrhage should the palatine artery be severed.

The after-treatment.—Bleeding from the jugular is used by some, but can be dispensed with in most cases unless there be a succession of paroxysms. A full purge of aloes and calomel is required, as in many cases the cause is intestinal. Then treat symptomatically.

Regulate the diet, give the necessary exercise, and use harness that fits properly.

CHOREA.

What are the synonyms?

St. Vitus's Dance; insanity of muscles; twitching disease; stringhalt in the horse.

Define chorea.

This is a functional, non-febrile disease of the nervous system characterized by irregular clonic contractions of the voluntary muscles, giving rise to movements not under control of the patient.

What is the morbid anatomy?

There are no definite lesions. Some claim the lesions are in the nervous system, while others say they are in the joints.

Give the ætiology.

The cause is unknown. It often attacks young and weakly subjects, although older animals are affected. It is probably due to some irritation of the nervous system. It may follow punctured wounds of the feet.

What are the symptoms?

In the horse, there is twitching of the muscles of the anterior extremity, those about the eyes, lips, shoulders, feet, etc.

In the posterior it has been called stringhalt; there is a spasmodic elevation of the extremity.

How may stringhalt be diagnosed?

In the stall, by causing the animal to get from one side of the stall to the other, or by trotting the animal and turning around in a short space. This condition is to be considered an unsoundness.

What is the prognosis?

Usually unfavorable as regards a cure, except it be the result of a punctured wound of the foot, when recovery will take place in the course of a week or ten days. These cases rarely terminate in death, but the course of the disease is somewhat slow.

What are the indications for treatment?

If due to punctured wounds of the feet, it gradually disappears by exercise. In other cases, if mild, the symptoms may disappear after being driven a short distance, but return after a rest.

The drugs indicated are the bromides, chloral, morphine,

valerian, cannabis indica, asafœtida, oxide of zinc, hyoscyamus, belladonna, arsenic, strychnine, iron.

CRAMP OF THE PATELLA MUSCLES.

Give the synonym.

Femoral cramp.

Define this condition.

This is a functional nervous affection of the anterior crural muscles principally, and characterized by tonic spasm of the muscles with inability to extend the leg.

What are the causes?

Overwork, strains, irritability of the nervous mechanism of these parts are among the principal causes. No doubt it may be produced by toxins acting on the nerves of these parts.

Give the symptoms.

This condition appears suddenly, usually after standing. The extremity is stiffened, it appearing longer than its fellow; there is knuckling at the fetlock, the horse resting on the toe. It is difficult for the animal to back and more difficult or impossible to go forward; if so, the extremity drags, the toe or fetlock dragging on the ground.

What is the treatment?

This condition, as a rule, readily yields to treatment. A stimulating liniment applied to the stifle and rest for a few days is about all required.

In some cases a purge or laxative may be given.

Feed on bran-mashes, grass, etc.

CATALEPSIA.

What are the synonyms?

Catalepsy; hypnotism of muscles.

Give the definition.

This is a peculiar condition of a stiffening of the voluntary muscles, characterized by a loss of power to contract the said muscles.

How is it diagnosed?

If the extremity be placed in any position it remains in that position.

This is a rare affection, but the Germans claim it has existed.

What can be done for these cases?

There is no treatment that can be recommended; electricity, massage, etc., may be tried.

EPILEPSY.

Give the synonyms.

Epilepsia; fits.

What is epilepsy?

This is a functional nervous disease, characterized by attacks of *unconsciousness*, with or without convulsions.

This affection is commonly seen among dogs, it being rarely seen among the equine race. It is said to exist in stallions, but only a few cases are recorded.

What are the indications for treatment?

Cold to the head, bromides, chloral, alcohol, Hoffmann's anodyne, digitalis, turpentine, ergot, tonics, etc.

Laxatives or purgatives may be necessary and beneficial.

CEREBRAL HYPERÆMIA.

What are the synonyms?

Cerebral congestion; congestion of the brain.

Define this condition.

It is an increased amount of blood in the vessels of the brain.

What are the forms of cerebral congestion?

There are two forms, viz., *the active form* and *the passive form.*

Define active cerebral hyperæmia.

This is where there is an increased amount of blood sent to the brain.

What is passive cerebral congestion?

There is an increased amount of blood in the vessels of the brain due to some obstruction of its passage from that organ.

What are the causes?

The active form is seen among young and plethoric animals which are predisposed. Heat exposure with hard work; animals kept in dark stables and suddenly exposed to light; certain drugs, as opium. Also the action of ptomaines and toxins.

The passive form may be caused by cardiac diseases, lung diseases, blood diseases. Tight collars, etc., preventing the return flow of blood from the brain.

What is the morbid anatomy?

The brain substance, as well as the meninges, are congested in pronounced cases. The color varies according to whether the active or the passive form exists; in the former a bright red color is present, while in the latter it varies from a blue to a purple.

Give the symptoms of cerebral congestion.

The symptoms are not well defined and are not constant.

How is the diagnosis made?

The cases are rare in the horse, and when they occur they are apt to be overlooked, as they are difficult to make out on account of the symptoms being vague.

What is the prognosis?

Good, unless rupture of the blood-vessels occur or it be associated with organic disease, especially of the heart.

What are the indications for treatment?

Keep the animal quiet in a box-stall with good ventilation (cool air).

Act on the bowels to draw the blood from the brain. Assist the purge (if necessary) by enemas (stimulating).

Locally, cold applications to the head. Some of the drugs indicated are belladonna, hyoscyamus, potassium bromide, aconite, ergot.

CEREBRAL ANÆMIA.

Give the synonym.

Anæmia of the brain.

What is cerebral anæmia?

It may be defined to be a lessened amount of blood in the cranial contents.

What is the post-mortem appearance?

The membranes are pale, the large veins are full, the small ones empty.

On section, there is an absence of bloody points, the cut surface is moist, and the substance is paler than normal.

What are the causes?

It may be associated with general anæmia, in those cases coming on slowly, or it may be the result of a severe hemorrhage, or may be caused by pressure or thrombosis or a narrowing of the vessels in that region or a dilatation of blood-vessels in other parts.

What are the symptoms?

Vertigo or dizziness is usually present, there is nervous excitement, the animal going forward or backward; there may be twitchings of muscles about the head and in some cases about the neck.

What is the prognosis?

Unfavorable as a rule, but depends on the cause.

Outline the treatment.

Treat symptomatically; build up the system and improve the blood.

Good food, light exercise, good hygiene, and watch the bowels.

The drugs indicated are iron, strychnine, arsenic, etc.

Alcoholic stimulants are useful in most cases. The bromides and chloral are contra-indicated.

The extremities should be hand-rubbed.

CEREBRAL HEMORRHAGE.

Give the synonyms.

Encephalic hemorrhage; intracranial hemorrhage; cerebral apoplexy; meningeal hemorrhage.

What is the definition?

Cerebral hemorrhage may be defined to be a rupture of one of the blood-vessels of the brain, characterized by coma and paralysis.

What is the morbid anatomy?

The lesions are mostly found in the cerebral arteries. Aneurisms are usually present. On section of the brain-substance, these appear as small, dark bodies, the size of a pin's head.

The hemorrhage may be *cerebral, meningeal,* or *intraventricular.*

Meningeal hemorrhage may take place outside the dura mater or between it and the arachnoid, or between the arachnoid and pia mater.

The extravasations cause pressure on the adjacent structures, and unless the products are absorbed motor paralysis occurs, followed by degeneration of the various tissues involved.

Give the causes.

Injuries or fractures of the skull, rupture of aneurisms, diseases of the walls of the vessels, overaction of the heart; this condition may be associated with certain general diseases. Heredity comes into play, as does age. In older animals the vessels become more brittle as a rule, and are thus prone to rupture.

Give the symptoms.

Symptoms of cerebral hemorrhage may be divided for study into primary and secondary.

THE PRIMARY SYMPTOMS are vertigo, uneasiness, twitching of muscles, the mucous membranes injected, and, if the hemorrhage be severe, unconsciousness and paralysis.

In severe cases the pulse is full, slow, and hard; the respirations are labored, deep, and stertorous; the temperature normal or subnormal; the pupils usually dilated; the eyes turned in their sockets; the head turned to one side; involuntary evacuations of the bladder and bowels due to relaxation of the sphincters, and a paralysis of a portion of the body, varying according to the situation of the hemorrhage. Secondary fever is usually present.

THE SECONDARY SYMPTOMS are changes taking place in various tissues along the course of the paralyzed nerves. The reflexes are greatly increased, there is flexion of parts of the extremities with loss of co-ordinating power. Atrophy of muscles may result, although it is not constant.

How may cerebral hemorrhage be diagnosed?

By the suddenness of the attack, by the head and eyes being deviated to one side, by the subnormal fever being followed by

secondary fever, by the inequality of the pupils, and by a paralysis remaining after consciousness is regained.

What is the differential diagnosis between cerebral congestion and cerebral hemorrhage?

In cerebral congestion there may be loss of consciousness, but it is only transient, and there is no paralysis that is permanent.

How may coma of cerebral apoplexy be differentiated from coma of opium poisoning?

By the primary depression, by secondary fever, by the deviation of the head and eyes, by the pupils not being equal, and by the signs of paralysis.

Give the prognosis.

These cases usually die or are destroyed. Mild cases may recover, with a paralysis of the ears, lips, etc., remaining.

What can be done for these cases?

The indications are to lessen the amount of blood to the part, and thus stop the hemorrhage. Purges to determine the blood to other parts.

Locally, cold applications to the head; later, blisters or setons may be indicated.

Iodide of potassium, colchicum, etc., to get rid of the results of hemorrhage.

CEREBRAL EMBOLISM AND THROMBOSIS.

Define each.

CEREBRAL EMBOLISM is a plugging or stopping up of the cerebral vessels by any substance, characterized by loss of consciousness, convulsions, and possibly paralysis.

CEREBRAL THROMBOSIS is a partial or complete obstruction of any portion of the circulatory apparatus of the brain with blood that has coagulated in the vessels or by any morbid product.

What are the causes?

Embolism may be the result of vegetations from the valves of the heart being washed into the stream, or it may arise from a thrombus or may be the result of a fragment of calcareous material.

Thrombosis is most frequently caused by some vascular dis-

ease. Enfeebled vitality and circulation and a condition of the blood to coagulate more readily are the principal causes.

How would you distinguish between the symptoms of cerebral embolism and those of cerebral hemorrhage?

The age may aid us, as *cerebral hemorrhage* is more likely to occur in old age, *embolism* in the young.

Cerebral hemorrhage is associated with diseases of the blood-vessels, while *embolism* is seen with cardiac disease.

In *cerebral hemorrhage* convulsions are not likely to be present, as they are in *embolism*, while paralysis of half the body follows hemorrhage.

Give the differential diagnosis between cerebral thrombosis and cerebral hemorrhage.

The symptoms of *thrombosis* come on more or less gradually, while those of hemorrhage are sudden and are associated with loss of consciousness.

Convulsions are present with *thrombosis*, but are localized; if present with *hemorrhage* they are general.

Conditions of depression point toward *thrombosis*, while conditions of excitement favor *hemorrhage*.

In hemorrhage the arterial tension is high; *in thrombosis* the circulation may be stagnant and the animal debilitated.

What are the indications for treatment?

The treatment is not satisfactory. If the heart is weak, give stimulants and digitalis. Iodide of potassium is useful.

Laxatives may be indicated, but not severe purges.

ENCEPHALITIS.

What are the synonyms?

Cerebritis; meningitis; arachnitis; pachymeningitis; leptomeningitis.

Define each.

Encephalitis is an inflammation of the contents of the cranial cavity.

Cerebritis may be defined to be an inflammation of the cerebrum proper.

Meningitis is an inflammation of the membranes covering the brain exclusive of the dura mater.

Arachnitis is an inflammation of the arachnoid membrane.

Pachymeningitis is an inflammation of the dura mater of the brain.

Leptomeningitis is an inflammation of the cerebral pia mater.

What are the causes?

It may be caused in about the same manner as congestion; it may be the result of traumatism or it may be an extension from some adjacent organ; parasites, emboli, thrombi are also among the causes as well as bacterial ferments from mouldy food.

Give the morbid anatomy.

Cerebritis may be non-suppurative or suppurative. In the non-suppurative form there are irregular foci, more or less rounded and about the size of a pea, distributed throughout a portion of the cerebral hemisphere.

In the suppurative form abscesses are found, either single or multiple.

In pachymeningitis suppurative changes usually occur. The dura mater is reddened, thickened, and extravasations of blood are found. The surface of the dura is covered with a fibrino-purulent exudation.

In leptomeningitis the pia mater is swollen, reddened, and a serous fluid is present, the ventricles containing fluid.

In arachnitis about the same condition is shown as in lepto-meningitis.

What symptoms are shown?

Symptoms of congestion are present in the beginning, which are usually vague.

The head becomes elevated, the nose thrown in the air, there is a fixed and anxious expression, muscular trembling, associated with paroxysms of fear, during which the animal will run forward, pull backward.

The pulse becomes full, in some cases slow, while in others quickened; *the respirations* are more or less labored and at times noisy; *the temperature* is elevated, being usually about 103° F. When in motion they walk like a partially blind horse, lifting the legs high, going sideways, pulling back, trembling, etc.

If delirium is present they push their heads against the wall, kick and thrash about; the pulse becomes quickened, the mucous membranes injected, the eye has a wild look, and there is heat over the region of the brain.

In the course of twelve or twenty-four hours symptoms of coma may be shown; the animal becomes dull, the head down or resting on the manger, the legs in various positions, either spread apart or together under the body; in these cases it is difficult to excite the animal, as the sensibility is diminished. There is an irregularity of the appetite and the bowels are costive.

What is the prognosis?

It is usually grave as regards a cure. An abscess may form and produce death, or immobility, hemiplegia, or blindness may result.

Give the indications for treatment.

Purgatives to determine the blood to other parts, cold applications locally are the principal indications.

The drugs likely to be indicated are aconite or veratrum, valerian, belladonna, hyoscyamus, and possibly stimulants.

If wounds are present, treat antiseptically.

HYDROCEPHALUS.

What is the synonym?

Cerebral dropsy.

What are the forms?

There are two forms, *congenital hydrocephalus* and *acquired hydrocephalus.*

What is congenital hydrocephalus?

This is an excessive accumulation of the cerebro-spinal fluid in the ventricles of the brain or in the meshes of the pia mater in the young, characterized by an enlargement of the head and more or less pronounced nervous phenomena.

Where is this form mostly met with?

This form is seen at the time of birth and is apt to cause difficulty in delivery. It is rare among foals, being more common in ruminants.

ACQUIRED HYDROCEPHALUS.

Give the synonyms.

Immobility; chronic hydrocephalus; the animal is called *a dummy.*

Define this form.

It is a chronic disease of the brain, with an accumulation of fluid in the ventricles and characterized by an alteration of consciousness, conception, and sensibility of varying degree.

Give the causes of this affection.

There is a hereditary tendency, and thus the animal should not be bred; in these cases, common-bred animals—especially those narrow between the ears and eyes—are the ones principally predisposed.

It may follow congestion or inflammation of the brain; also tumors causing pressure. Poor food, bad hygienic surroundings, hot weather, bad-fitting harness, overwork, etc., are among the causes.

What is the pathological anatomy?

The convolutions of the brain are flattened, the depressions or sulci less marked or obliterated, the cortical substance diminished and pale, corpora quadrigemina, the optic thalami, etc., flattened from pressure of the exudation, the ventricles contain fluid, the membrane forming the walls of the ventricles is thickened. Continued pressure of the exudate causes an atrophy of various portions of the brain, thus interfering with their functions.

What are the symptoms?

The symptoms have to be studied under two conditions: *first,* when at rest in the stall, and, *second,* when the animal is in motion.

When in the stall there is a disorder of consciousness, shown by the peculiar position the animal assumes by standing diagonally in the stall, the head hanging down or supported on the manger, eyes half closed, legs crossed, resting the heel of the shoe on the coronet of the opposite foot, sensibility is diminished, the animal taking no notice of the whip or flies. In drinking, they plunge their heads to the bottom of the trough, drink a little, and then stop; soon the nose is withdrawn in order to get breath.

In feeding, the animal masticates a while, but soon stops, the food protruding or dropping from the mouth.

At times paroxysms of fear present themselves, the animal running forward, pulling backward, etc., which symptoms soon disappear, the animal becoming comatose again.

When in motion the head is low down, the feet are raised high in the air, somewhat similar to a partially blind horse or one walking in water. At times there is stumbling, they travel slowly or refuse to work, and it is difficult to back them; in backing they drag the feet, often tearing up the earth.

Give some of the general symptoms.

The pulse is slow, often being 20 or 30 beats per minute; the bowels are torpid; the condition of the body is good (they look fat). In hot weather they are apt to have the symptoms increased, and are liable to do damage if vertigo should occur; in cold weather the symptoms abate.

How is the affection diagnosed?

By the symptoms, but in many cases where the symptoms are vague it becomes necessary to *raise blood pressure* by having the animal galloped for a time. This often increases the symptoms.

What is the prognosis?

These cases are chronic in their course, and often remain stationary for years unless increased by food, work, climate, etc. It is very rare to have these cases recover.

What is the treatment in chronic hydrocephalus?

No satisfactory mode of treatment has yet been recommended that will cure; these cases may be relieved.

Good hygienic conditions, moderate work, careful feeding, etc., are essential.

If paroxysms of fear are shown, bleed or purge; then potassium bromide, chloral, etc.

Diuretics and absorbents are beneficial; colchicum, potassium nitrate, potassium iodide, etc., are among the best known remedies.

What affections occur in which horses may be found down?

They may be down and unable to arise (except possibly with great difficulty) in *paralysis, myelitis, apoplexy of the spinal cord,*

azoturia, spinal meningitis, osteoporosis, sunstroke, fractures, cerebrospinal meningitis, or in other cases the animal may be a so-called *malingerer.*

Define paralysis.

Paralysis (*akinesis*) may be defined to be a condition characterized by a loss of voluntary or involuntary muscular movements owing to defective innervation.

What is hemiplegia?

This is a form of paralysis characterized by a loss of power of many of the muscles of *one-half* of the body.

What is meant by crossed hemiplegia?

Crossed hemiplegia is that form of paralysis characterized by a loss of power of the muscles of one side of the body and those of the face of the opposite side.

What do you understand by spinal hemiplegia?

Spinal hemiplegia is that form of paralysis characterized by a loss of muscular power of one side of the body, the muscles about the head being normal.

Paraplegia signifies what?

By paraplegia is meant a loss of voluntary power of one *transverse half* of the body, the caudal portion being usually the part involved. When the other half is the seat it is called cervical paraplegia.

What is monoplegia?

It is a local or circumscribed paralysis affecting one extremity or one group of muscles.

Define myelitis.

It is an inflammation of the substance of the cord itself, characterized by a *loss of reflexes* and a paralysis of the rectum, bladder, and posterior extremities.

What is apoplexy of the spinal cord?

This is a sudden hemorrhage into the substance of the cord and characterized by spasms of muscles or paralysis and sometimes by hæmaturia.

Define polio-myelitis.

It is an inflammation of the large ganglion-cells of the anterior horns of gray matter of the cord which control nutrition as well as motion of the parts to which the nerves are sent.

What is meant by a malingerer?

A malingerer is an animal that is apparently simulating disability; the animal is usually down, and will make no efforts to get up, even after being whipped, etc.

Define spasm.

Spasm signifies an abnormal and often violent involuntary muscular contraction, with or without loss of consciousness.

How are they divided clinically?

Into *tonic spasms* and *clonic spasms.*

What are tonic spasms?

Tonic or *tetanic spasms* are those where the muscular contractions are constant or continuous for a measurable length of time.

Define clonic spasms.

Clonic spasms are those that show the contractions to rapidly intermit, and may be general or local.

What is cramp?

This may be defined to be a tonic spasm of muscles associated with intra-muscular pain.

Describe reflex action.

A reflex action may be defined to be a movement or a secretion which is the result of the transformation of a centripetal impression into a centrifugal impulse.

What apparatus is required?

The skin or mucous membrane, or deeper structures, to receive the impression; *a sensory afferent nerve* to convey it; *a nervous centre* to receive and transform it; *a motor or efferent nerve* to transmit the impulse to the muscle, the wall of a vessel, a gland, etc.

Normally, many functions of the animal body are performed by reflex action; the secretion of glands, etc., the movements of hollow organs, the movements of blood-vessels, as well as muscles.

SPINAL MENINGITIS.

What are the synonyms?

Spinal disease; spinal fever.

Define the same.

Spinal meningitis is an inflammation of the meninges of the spinal cord characterized by a loss of power and sensibility of the posterior extremity.

What is the morbid anatomy?

The membranes of the cord as well as those of the brain may be hyperæmic, thickened, and ecchymosed. A serous or purulent fluid may be present between the membranes.

Give the ætiology.

The cause is not well understood. Bad hygienic conditions, overwork, excessive heat, are thought to share in causing the disease. Probably it is produced by a micrococcus.

What are the symptoms?

The symptoms vary in intensity in in-cases or out-breaks.

There is a loss of power of the hind extremities, it being difficult to back the animal out of the stall and in turning around; there is a swaying or staggering from side to side. The legs cannot co-ordinate properly, the animal drags the toe of the hind extremities, and there is a sort of cross-legged gait. The tail will be found lax, and if you raise it, it will fall powerless. If these symptoms increase the animal will fall down and be unable to rise. *The temperature* is usually about 101° or 101½° F.

With what diseases may spinal meningitis be confounded?

With *influenza* and *azoturia* principally.

How may spinal meningitis be distinguished from influenza?

By the lax condition of the tail, by the temperature being 101° or 101½° F., by the dragging of the toe of the hind extremities in *spinal meningitis* and by the higher fever 103° to 106° F., by the

absence of paralysis, by the swollen extremities, and by the staggering gait denoting general weakness in *influenza*.

Give the differential diagnosis between spinal meningitis and azoturia.

See AZOTURIA.

What is the prognosis?

Mild cases usually recover if no complications arise.

Severe cases, especially when down, are apt to prove fatal.

Outline the treatment.

Place the animal in slings, give a purge, after which give belladonna every two or three hours till the action of the purgative is established. Aconite may be indicated and can be given with belladonna.

After the action of the cathartic, give strychnine in one-grain doses and gradually increase till the physiological effect is obtained.

Draw off the urine daily; give enemas to aid the purge, and apply liniments or blisters locally.

After a time, exercise to tone up the muscles.

SECTION X.

INTOXICATIONS.

SUNSTROKE.

What are the synonyms?

Insolation; thermic fever; heat stroke; heat exhaustion; solar exhaustion.

Define the same.

By this we mean a condition caused by the exposure to excessive heat characterized by certain nervous phenomena.

How many varieties, and what are they?

There are two varieties, *sunstroke proper*, or *thermic fever*, due to the direct exposure to the sun's rays, especially during active exercise or work.

The other variety is called *heat-stroke* or *heat-exhaustion*, which occurs after being subjected to prolonged intense heat, either of the sun's rays or of artificial heat.

Give the symptoms.

The symptoms of sunstroke come on more or less suddenly during exposure to the sun; perspiration ceases, there is dyspnœa or difficult breathing, the animal staggers and may fall down, being unable to rise.

The pulse becomes weak, the temperature rises to 104°, 107°, or, in some cases, 110° F.

The animal becomes more or less insensible, the bowels constipated, the urine scanty, but the reflexes are usually preserved.

In some cases cerebral symptoms predominate and are somewhat similar to apoplexy.

The pupils become insensible to light, the vessels of the head and neck are full, the respirations become labored and stertorous, the pulse labored and full, and convulsions may take place.

The symptoms of heat-exhaustion are those of weakness; there

is a feeble pulse, the respirations are quickened, but are free; the temperature is not so high.

What is the morbid anatomy?

Rigor mortis occurs early, and putrefactive changes develop very rapidly.

The venous engorgement is extreme, especially in the cerebrum.

The left ventricle is contracted and the right dilated.

The blood is usually fluid, the lungs congested, and changes occur in the tissue proper of the liver and kidneys.

Give the prognosis.

Favorable indications are the recovery of consciousness and a fall in the temperature and increase in the amount of strength.

Laminitis, congestion of the lungs, colic, etc., may be the sequelæ.

How is this condition diagnosed?

It is well for us to differentiate between *heat-exhaustion* and *thermic fever.*

In solar exhaustion the skin is moist, pale, and cool; the respirations are easy and accelerated, the pulse is soft and small, the vital forces show temporary depression, and the senses remain intact.

Whereas *in sunstroke* there are usually unconsciousness and pyrexia.

Thermic fever is recognized by the history of exposure, the high temperature, dryness of the skin, the suddenness of the attack, the reflexes being normal, and the absence of paralysis.

Outline the treatment.

Keep the animal in a cool place out of the direct rays of the sun, and keep him as quiet as possible.

Cold applications to the head or the body, and cold injections per rectum.

Stimulants may be necessary, the use of carbonate of ammonia, etc.; also brandy hypodermically may be indicated.

Ether, chloroform, in some cases chloral hydrate, especially where cerebral symptoms predominate, to quiet the animal.

Belladonna to combat congestion, quinine to reduce the fever, and nux vomica to tone up the nerves are often beneficial.

The use of purgatives, or, in some cases, bleeding.

AZOTURIA.

Name the synonyms.

Hæmoglobinuria; hæmoglobinæmia; spinal typhus; rheumatic paraplegia.

Give the definition.

Azoturia comes from *azot*, meaning *nitrogen*, and *uria*, signifying *urine*.

It is a hypernitrogenized condition of the blood, characterized by dark-colored urine and a peculiar dropping of the posterior extremity, with knuckling at the fetlock.

What is the ætiology?

There are several theories as regards the cause of this disease; some say the liver is at fault, others the skin and kidneys, others the nerves; the German theory is that the increased amount of nitrogen comes from the muscles, due to irritation of the nerves, producing tissue changes. Too much nitrogenous food and no exercise.

It is not infrequently met with, especially in the city, among the heavy draft horses. It is most frequently seen usually during the cold weather immediately following holidays when the animals are kept in the stable for a day or so after hard work and in many cases fed the same amount and kind of food as if they were working.

It is, in my opinion, produced by some poison or toxin which acts on the nerves showing the array of symptoms. I have, therefore, classified it as an intoxication.

Give the symptoms.

When taken out of the stable they feel good, kick up, and the driver can hardly hold them.

Usually, after driving, for say half a mile or so, the horse becomes lame behind, kunckles over, falls down, and cannot get up.

Or, in other animals, they get lame, sweat freely, become uneasy, looking around at their belly, and you think they have colic; but, if you attempt to move them, you see there is the loss of power of one leg, with knuckling over at the fetlock; the driver often suspects the horse has picked up a nail. This is one of the principal symptoms, that of *knuckling over*, and also of the peculiar *falling of the hip*.

Another thing is to look at the cramped condition of the

gluteal muscles; they are hard and appear swollen, and often you see a deep depression on the median line.

If there is any doubt about the diagnosis, examine the urine, which is generally dark in color, being of a brownish coffee color, or, in some cases, an intense black.

The pulse is full and quickened, the mucous membranes injected, the temperature 102° to 103° F. (from excitement), and the respirations are apt to be increased in number.

How may it be diagnosed?

This is made by the history of the case, of the animal standing in a few days and being well fed.

It usually occurs in large truck horses.

The knuckling over of the hind ankle, first one, and then both, and the coffee-colored urine.

Horse may be down, but remember the various other affections in which the decubital position is a symptom.

With what disease may azoturia be confounded?

It may be mistaken for *spinal meningitis, colic,* and *fractures* principally.

How may it be differentiated from spinal meningitis?

In azoturia there is a cramp or tonic spasm of the gluteal muscles, while *in spinal meningitis* there is a loss of power of the muscles.

In *azoturia* there is an inability to bear weight; in *spinal meningitis* weight can be sustained, but there is a lack of muscular power to perform co-ordinate movement of the extremities.

In azoturia there is a peculiar dropping of one extremity, with knuckling at the fetlock, while in *spinal meningitis* there is a dragging of the toe and swaying of the posterior portion of the body.

In azoturia the temperature varies, averaging about 102° to 103° F., while in *spinal meningitis* it is usually 101° or 101½° F.

In azoturia the tail has not lost its power, while *in spinal meningitis* the tail is limp (has no power).

What is the differential diagnosis between azoturia and colic?

In both cases the animal may be down, but *in colic* they are able to get up and stand up, do not knuckle over at the fetlock, and the urine is not coffee-colored, as *in azoturia.*

How may azoturia be differentiated from fractures?

By a careful examination and manipulation of the parts and discovering the crepitation.

Give the prognosis.

The prognosis is variable and depends on the time and place as well as the condition of the animal.

If the animal is down, very uneasy, having symptoms of delirium, then the prognosis is grave. In other cases the animal remains standing, the case looks favorable, but soon the patient gets weak, falls down, thrashes around, and is either destroyed or dies.

In other cases the animal remains quiet (either standing or down), the medicines seem to act well, and the horse recovers.

The prognosis should always be guarded, as 85 or 90 per cent. of severe cases die. The color of the urine may be a guide, the darker the urine the more grave the prognosis, as a rule.

The prognosis seems to vary in different years. Sometimes 80 to 95 per cent. are fatal while another time 80 to 90 per cent. recover; again paralysis of the muscles at the stifle results.

Give the treatment.

There is no remedy, as yet, that has given satisfaction.

Bleeding has been recommended, and theoretically, it would seem to be indicated, but, practically, it is difficult to do, as the animals are often down and thrashing about.

Bleeding, however, relieves the pressure on the blood-vessels, and the remedial agents in the alimentary tract will be more readily taken up. It should be followed by an injection of normal saline solution to replace the blood drawn, especially if a large quantity is drawn.

These animals are generally uneasy; they get up on their front feet, bang their head on the floor, and thrash about; in these cases we usually give chloral hydrate to quiet them.

The next indication is to unload the bowels by a full dose of aloes with calomel.

This should be followed by diuretics, as nitrate of potassium or colchicum, or a combination of these. Many advise strychnine and other nerve-stimulants when the acute symptoms have subsided.

Enemas may be given to assist the action of the purge.

Another remedy recommended by the Germans is eserine given in the trachea.

Shall we use slings?

This depends a good deal on the people that we come in contact with.

The majority of cases die anyway, and many of our clients will not be satisfied unless we at least try to sling these animals.

The rule is that it is best *not to sling*, except in some of the milder cases, where the animal is partially able to stand. They generally sag in the slings, break out in a sweat, thrash around, break the slings possibly, and you have to let them down.

The cases often make a complete recovery in four or five days.

Often they may not die, but are apt to have paralysis of the muscles of one leg. The anterior crural nerve is paralyzed, causing atrophy of the muscles in that region, and they have a peculiar motion—a dropping of that extremity. The paralyzed condition in many cases responds to strychnine by the mouth and hypodermically. The animal should be turned to pasture for natural exercise after the acute symptoms have subsided. If improvement is shown up to about four months the animal will usually recover to usefulness in from eight to ten months. After about six months, forced exercise in the shape of slow work (drawing fairly heavy loads) will often aid the development of the muscles. If no improvement whatever in four months destruction is advisable.

The affection usually commences in one leg and may gradually include the other, that is, affecting both.

Always examine the urine, which should be drawn off with a catheter at least once in twenty-four hours. In some cases there may be a spasm of the muscles of the penis, which renders it almost impossible to introduce a catheter. In these cases introduce the arm into the rectum and cause pressure on the bladder; this will often enable you to draw down the penis and introduce the catheter, or it may cause an evacuation of bladder without using the catheter. The urine may be so thick that it will not run. Theoretically, it would seem that the bladder should be washed out with warm water containing boric acid, quinine, bichloride of mercury, etc., and it may be good practically.

Hot blankets over the loins may do some good, but blisters, etc., do harm in the beginning.

Keep animal as quiet as possible, give a good soft bed, soft feed, and plenty of water, and turn the animal from side to side once or twice during twenty-four hours to avoid bed-sores.

APPENDIX.

PRESCRIPTIONS USED IN EQUINE PRACTICE.

COLIC BALL.

℞. Pulveris opii,
Extracti belladonnæ folii..āā ʒ j.
Pulveris zingiberis radicis,
Bismuthi subnitratis.....āā ʒ ij.
Misce et fiat bolus.

Sig.: Give, and repeat if necessary. Good if diarrhœa is present.

CHRONIC DIARRHŒA.

℞. Ferri sulphatis..... ℥ j.
Pulveris nucis vomicæ..... ʒ iv.
Bismuthi subcarbonatis..... ʒ ij.
Sodii bicarbonatis..... ʒ iss.
Misce et fiant capsulæ, No. viij.

Sig.: One, night and morning. Allow the animal to drink at least one hour before driving.

FEVER PILLS.

℞. Quininæ sulphatis..... ℥ j.
Pulveris hydrastis Canadensis,
Pulveris nucis vomicæ....āā ʒ ij.
Pulveris zingiberis radicis... ℥ ss.
Misce et fiant capsulæ, No. iv.

Sig.: One every three hours.

SUPERPURGATION.

℞. Pulveris opii,
Catechu pulveris..... ..āā ʒ ss.
Aluminis,
Pulveris zingiberis radicis..āā ʒ j.
Misce et fiat capsula.

Sig.: Give at once and, if necessary, repeat in two or three hours.

TONIC PILLS.

℞. Strychniæ sulphatis..... gr. iv.
Extracti belladonnæ folii.. ʒ iv.
Pulveris gentianæ radicis.. ℥ j.
Misce et fiant pilulæ, No. viij.

Sig.: One, three times a day.

STIMULANT PILLS.

℞. Ammoniæ carbonatis..... ℥ j.
Pulveris digitalis folii,
Nucis vomicæ pulveris....āa ʒ ij.
Syrupi fusci..... ...q. s.
Misce et fiant boli, No. iv.

Sig.: One pill every three hours. If the heart is weak, may be beneficial in bronchitis, pneumonia, pleurisy, influenza, etc.

PURGING BALL.

℞. Aloes Barbadensis..... ʒ viss.
Hydrargyri chloridi mitis.. ʒ j.
Extracti belladonnæ..... ʒ ss.
Pulveris zingiberis radicis.. ℥ ss.
Misce et fiat bolus.

Sig.: Give after having the horse prepared by dieting.

The amount of aloes varies with the case, the size of the horse, etc.

COUGH POWDERS.

℞. Asclepiadis tuberosæ,
Potassii nitratis .....āā ℥ iv.
Antimonii et potassii tartratis. ʒ iv.
Misce et fiat pulvis; divide in chartulæ, No. viij.

Sig.: One powder two or three times a day.

May be used in chronic bronchitis, laryngitis.

DIURETIC POWDERS.

℞. Potassii nitratis ..... ℥ viij.
Potassii iodidi,
Pulveris colchici seminis.āā ℥ ss.
Misce et fiant pulveres, No. viij.

Sig.: One powder every three hours, in food or drinking-water.

Useful in laminitis, lymphangitis, pleurisy, influenza, purpura hæmorrhagica.

FEVER BALLS.

℞. Antimonii et potassii tartratis,
Camphoræ gummi .....āā ʒ ij.
Potassii nitratis..... ʒ iv.
Massæ communis.....q.s.
Misce et fiant boli, No. iv.

Sig.: Give one at once and repeat when necessary.

FLATULENT COLIC.

℞. Pulveris carbonis liqni..... ʒ j.
Sodii bicarbonatis..... ʒ iv.
Bismuthi subcarbonatis ..... ʒ ij.
Pulveris capsici..... ʒ j.
Misce et fiant capsulæ, No. ij.

Sig.: Give one, and repeat if necessary.

COLIC BALL.

℞. Chloralis hydratis..... ʒ j.
Pulveris lobeliæ ..... ʒ ss.
Glyceriti amyli.....q. s.
Misce et fiat bolus.

Sig: Give at once; can repeat in half an hour, if necessary.

ACIDITY OF STOMACH.

℞. Sodæ bicarbonatis,
Pulveris gentianæ radicis,
Pulveris zingiberis radicis..āā ʒ iij.
Pulveris capsici..... ʒ j.
Bismuthi subcarbonatis... . ʒ vj.
Misce et fiat pulvis in scatula.

Sig.: Half ounce in feed, two or three times a day.
Useful after colic due to indigestion.

ALTERATIVE POWDER.

℞. Sulphuris pulveris..... ʒ iij.
Potassii nitratis,
Potassii bitartratis.....āā ʒ ij.
Antimonii nigræ..... ʒ j.
Misce et fiant pulveres, No. viij.

Sig.: One powder two or three times a day.

DRYING POWDER.

℞. Zinci sulphatis,
Aluminis pulveris.....āā ʒ ij.
Sanguinariæ radicis..... ʒ ss.
Misce et fiat pulvis in scatula.

Sig.: Wash sore and dust on the powder.
Good for summer sores.

DRYING POWDER.

℞. Carbonis animalis..... ʒ ij.
Hydrastis Canadensis,
Aluminis.....āā ʒ ss.
Misce et fiat pulvis.

Sig.: After washing the sore sprinkle on the powder.
Useful in superficial wounds where dressings cannot be applied.

ELECTUARY.

℞. Potassii chloratis,
Pulveris extracti belladonnæ folii.....āā ʒ ss.
Pulveris glycyrrhizæ radicis.. ʒ ij.
Syrupi fusci.....q. s.
Misce et fiat electuarium.

Sig.: A drachm or two on tongue three or four times a day.
Good in laryngitis, etc.

ELECTUARY.

℞. Camphoræ gummi,
Extracti belladonnæ folii..āā ʒ j.
Ipecacuanhæ ..... ʒ iss.
Massæ communis ..... ʒ iv.
Misce et fiat electuarium.

Sig.: Half ounce on tongue three or four times a day.
Used for troublesome cough.

COLIC MIXTURE.

℞. Fluidextracti cannabis Indicæ,
Fluidextracti belladonnæ,
Fluidextracti zingiberis radicis.... .....āā ʒ iij.
Spiritus ætheris nitrosi..... ʒ iij.
Alcoholis diluti.....q. s. ad ʒ vi.
Misce et fiat mistura.

Sig.: Give one ounce with syringe and repeat in twenty minutes or half hour, according to indications.

FEVER MIXTURE.

℞. Quininæ sulphatis..... ʒ j.
Acidi hydrochlorici diluti... f ʒ j.
Tincturæ nucis vomicæ,
Tincturæ capsici.....āā ʒ ss.
Spiritus frumenti..... ʒ iv.
Aquæ.....q. s. ad ʒ viij.
Misce et fiat mistura.

Sig.: One ounce every three hours (given with syringe).

MIXTURE FOR DROPSY.

℞. Fluidextracti nucis vomicæ,
Fluidextracti colchici.....āā ʒ j.
Olei terebinthinæ..... ʒ iv.
Spiritus vini rectificati..... ʒ vj.
Aquæ.....q. s. ad ʒ xij.
Misce et fiat mistura.

Sig. : One ounce every three or four hours.

Dose varies from half-ounce to an ounce.

Good in purpura hæmorrhagica, azoturia, etc.

FOR PULMONARY EMPHYSEMA.

℞. Potassii iodidi..... ʒ j.
Strychninæ sulphatis..... gr. viij.
Liquoris potassæ arsenitis. ʒ viij.
Aquæ.....q. s. ad Oj.
Misce et fiat mistura.

Sig. : One ounce three times a day.

ACUTE BRONCHITIS.

℞. Antimonii et potassii tartratis..... ʒ j.
Liquoris ammonii acetatis.. ʒ viij.
Spiritus ætheris nitrosi..... ʒ vj.
Tincturæ aconiti..... ʒ iss.
Aquæ.....q. s. ad Oj.
Misce et fiat mistura.

Sig. : One ounce every two or three hours.

LOTION (ANODYNE AND ASTRINGENT).

℞. Liquoris plumbi subacetatis. ʒ ij.
Tincturæ arnicæ,
Tincturæ opii.....āā ʒ j.
Aquæ. .....ad ʒ xij.
Misce et fiat lotio.

Useful for fresh bruises, wounds, sprains, etc.

PARASITICIDE.

℞. Hydrargyri bichloridi..... ʒ ss.
Alcoholis..... ʒ vi.
Aquæ.....q. s. ad Oj.
Misce et fiat lotio.

Sig. : After washing to soften and remove the scabs, apply. If it irritates too much, stop and apply sweet oil, vaseline, etc.

May be used for ringworm, favus, scabies, etc.

TONIC MIXTURE.

℞. Tincturæ nucis vomicæ,
Tincturæ capsici.....āā ʒ ij.
Liquoris potassii arsenitis.. ʒ iij.
Aquæ.....q. s. ad ʒ viij.
Misce et fiat mistura.

Sig. : One ounce three times a day before feeding.

LINIMENT (ANODYNE).

℞. Tincturæ opii. ..... ʒ ij.
Tincturæ belladonnæ,
Tincturæ aconiti.....āā ʒ j.
Linimenti saponis...q. s. ad ʒ viij.
Misce et fiat linimentum.

Sig. : Apply two or three times a day.

LOTION FOR BURNS.

℞. Olei lini,
Liquoris calcis.....āā ʒ viij.
Acidi carbolici..... ʒ j.
Misce et fiat lotio.

Sig. : Wet the dressing and cover the part to exclude the air.

LINIMENT (STIMULATING).

℞. Tincturæ cantharidis,
Camphoræ gummi,
Tincturæ capsici.....āā ʒ ij.
Linimenti saponis ...q. s. ad ʒ xij.
Misce et fiat linimentum.

Sig. : Apply two or three times a day. For sprains, sorethroat, etc.

FOR BURNS.

℞. Acidi borici..... ʒ ss.
Aquæ rosæ ..... Oj.
Misce et fiat lotio.

Sig. : Apply piece of oil-silk dipped in solution and cover with loose bandage.

WHITE LOTION.

℞. Zinci sulphatis..... ʒ vj.
Plumbi acetatis pulveris..... ʒ j.
Aquæ ..... Oj.
Misce et fiat lotio.

Sig. : Bathe parts two or three times a day.

Beneficial for swollen legs after the acute symptoms have subsided.

RINGWORM.

℞. Argenti nitratis..... gr. x.
Adipis benzoinati..... ʒ j.
Misce et fiat unguentum.

Sig.: Wash the parts and apply.

INJECTION FOR FISTULA.

℞. Hydrogenii peroxidi,
Liquoris calcis.....āā ʒ viij.
Misce et fiat solutio.

Sig.: Inject once a day, the quantity to vary with the case.

Good in all cavities where pus is present.

FISTULOUS TRACTS.

℞. Hydrargyri bichloridi,
Acidi hydrochlorici.....āā ʒ ss.
Aquæ bullientis ..... ʒ lx.
Misce et fiat solutio.

Sig.: Inject once a day, according to indications.

EYE DROPS.

℞. Atropinæ sulphatis..... gr. iv.
Aquæ destillatæ ... . ʒ j.
Misce et fiat collyrium.

Sig.: Few drops in eye two or three times a day.

May be used in conjunctivitis, etc.

COLLYRIUM.

℞. Argenti nitratis ..... gr. ij.
Aquæ destillatæ..... ℥ j.
Misce et fiat collyrium.

Sig.: Apply to the membrane with camels'-hair brush.

In conjunctivitis.

UNGUENTUM CANTHARIDIS.

Used in American Veterinary College.

℞. Picis liquidi,
Resinæ.....āā ʒ iv.
Ceræ flavæ..... ʒ iij.
Olei olivæ..... ʒ xj.
Pulveris cantharidis..... ʒ vj.
Pulveris euphorbii... ..... ʒ ij.
Misce et fiat unguentum.

Melt first three, add oil and then the powders; stir till cold.

FOR SCABIES.

℞. Creosoti..... ʒ j.
Alcoholis diluti ..... ʒ xv.
Aquæ..... ʒ xl.
Misce et fiat lotio.

Sig.: Apply after washing the parts thoroughly.

UNGUENTUM HYDRARGYRUM.

℞. Hydrargyri biniodidi ..... ʒ ij.
Adipis ..... ʒ ij.
Misce et fiat unguentum.

Good for curbs, splints, etc.

HOOF OINTMENT.

℞. Ceræ flavæ,
Olei olivæ,
Adipis,
Terebinthinæ Venetæ,
Mellis.....āā ʒ viij.
Misce et fiat unguentum.

Melt wax, oil, and lard—slow fire and copper pan; then add rest and stir till cold.

ABSORBING OINTMENT.

℞. Iodi,
Potassii iodidi.....āā ʒ ss.
Adipis. ..... ʒ j.
Misce et fiat unguentum.

Sig.: Rub in well once or twice a day till the part becomes slightly blistered; stop for a day or so and apply sweet oil.

Good for swollen glands, knee-capped hock, etc.

℞. Unguenti zinci..... ʒ ij.
Balsami Peruviani.... ..... ʒ ij.
Acidi carbolici..... ʒ ss.
Misce et fiat unguentum.

Sig.: Apply after washing the parts.

For sores, cracked heels, etc., especially if moist.

℞. Cupri subacetatis..... ʒ ij.
Adipis ..... ʒ ij.
Misce et fiat unguentum.

Sig.: Wash parts thoroughly and apply.

May be used for cracked heels, grease heels, etc.

PRESCRIPTIONS USED IN CANINE PRACTICE.

ASTHMA.

℞. Pulveris ipecacuanhæ,
Pulveris opii..... . āā gr. vj.
Pulveris glycyrrhizæ radicis ..... gr. xxiv.
Pulveris rhei..... gr. xij.
Misce et fiant pilulæ, No. xxiv.

Sig.: One pill night and morning.

ASTHMA.

℞. Potassii iodidi ..... ʒ ij.
Spiritus ammoniæ aromatici.. ℥ j.
Tincturæ quassiæ,
Aquæ.....āā ℥ ij.
Misce.

Sig.: ʒ j. t. i. d.

May be used during and between the attacks.

STOMACH WORMS.

℞. Santonini,
Hydrargyri chloridi mitis. āā gr. iij.
Misce et fiant pilulæ, No. vj.

Sig.: Give one each morning till two or three pills have been given.

Dose varies from half a pill to three pills, according to size and age of pup.

HEMORRHOIDS.

℞. Pulveris opii..... ..... ℈ ij.
Acidi tannici ..... ʒ iss.
Unguenti zinci... ..... ℥ iij.
Misce et fiat unguentum.

Sig.: Apply once or twice a day.

COLIC.

℞. Extracti cannabis Indicæ fluidi..... ʒ j.
Spiritus chloroformi ..... ʒ ij.
Acidi hydrocyanici diluti .... ʒ ss.
Acaciæ pulveris ..... ℥ ss.
Aquæ.....q. s. ad ℥ ij.
Misce et fiat emulsum.

Sig.: ʒ j. in water, repeated till pain is relieved.

Good where colics are caused by indigestible food.

RACHITIS.

℞. Calcii phosphatis,
Ferri phosphatis.....āā gr. xxxvj.
Misce et fiant pulveres, No. xij.

Sig.: One powder night and morning.

OTITIS.

℞. Acidi carbolici,
Zinci sulphatis,
Plumbi acetatis.....āā gr. x.
Aquæ destillatæ ..... f ℥ viij.
Misce et fiat solutio.

Sig.: Inject twice a day.

Good, especially where the discharge is offensive.

IRITIS—KERATITIS.

℞. Atropinæ sulphatis..... gr. ij.
Glycerini..... gtt. v.
Aquæ rosæ..... ʒ j.
Misce et fiat collyrium.

Sig.: Few drops in eye two or three times a day.

TONIC IN DYSPEPSIA.

℞. Pulveris calumbæ,
Zingiberis radicis pulveris..āā ʒ j.
Misce et fiant pulveres, No. vj.

Sig.: One in molasses or syrup three times a day.

INDIGESTION POWDERS.

℞. Bismuthi subnitratis ..... ʒ ij.
Pepsini ..... ʒ j.
Misce et fiant pulveres, No. xij.

Sig.: One on tongue every two or three hours.

Good where food is vomited; best given after eating.

CONSTIPATION.

℞. Olei ricini..... ℥ iss.
Syrupi rhamni cathartici.... ℥ j.
Syrupi papaveris..... ℥ ss.
Misce.

Sig.: Half to two ounces (repeated if necessary). according to size of dog, etc.

FEVER MIXTURE.

℞. Quininæ sulphatis..... ..... ℥ j.
Acidi hydrochlorici diluti . f ℥ j.
Tincturæ belladonnæ..... ℥ iss.
Spiritus ætheris nitrosi..... ʒ j.
Aquæ .....q. s. ad ʒ iij.
Misce.

Sig.: ℥ j. or ℥ ij. every two or three hours.

FOR ULCERS.

℞. Sodii chloridi ..... ʒ iiss.
Mentholis ..... ℥ ij.
Misce et fiat pulvis.

Sig.: Wash well and apply the powder.

Useful in ulcers that are slow to heal.

FOR SCABIES.

℞. Sulphuris præcipitatis ..... ʒ ss.
Balsami Peruviani ..... ʒ ss.
Adipis,
Petrolati.....āā ʒ iss.
Misce et fiat unguentum.

Sig.: Wash parts and apply.

ACUTE INDIGESTION.

℞. Tincturæ nucis vomicæ,
Acidi hydrochlorici diluti..āā ℥ ss.
Bismuthi subnitratis..... ℥ ij.
Liquoris pepsini ..... ʒ j.
Syrupi aurantii .....q. s. ad ʒ ij.
Misce.

Sig.: Teaspoonful every three hours.

Good where there is a lack of gastric juice and the digestive powers are weak.

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